NATIONAL CAR BUILDER

VOLUME XII. NUMBER 11.

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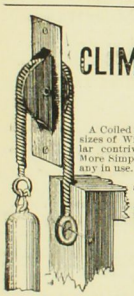

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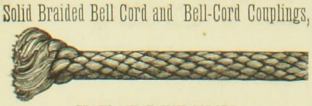

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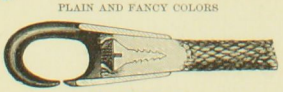

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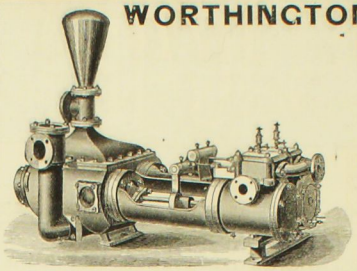

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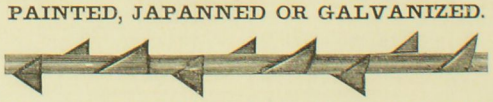

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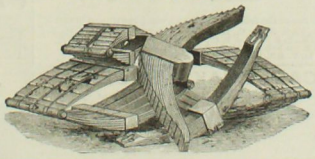
EXTRA TEMPERED,  LIGHT ELLIPTIC

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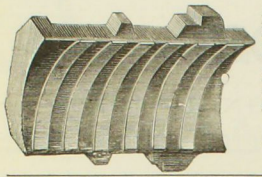

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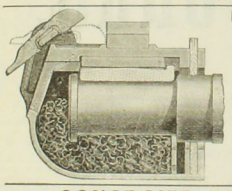

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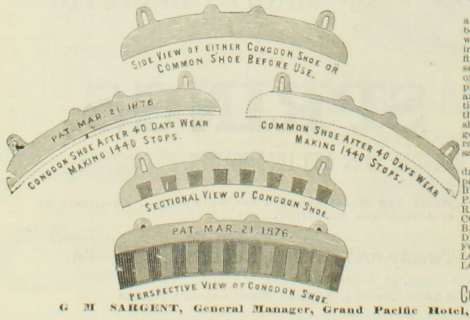

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Offices, No. 10 N. Jefferson St., Chicago.
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WROUGHT IRON PIPE,
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For Steam and Gas Fitters and Engine Builders,
CAST IRON and MALLEABLE IRON FITTINGS
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Hollow Stay-Bolt Iron, Babbitt Metal, &c.
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GRATE BARS, &c., &c.

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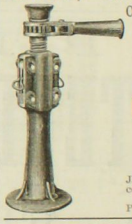
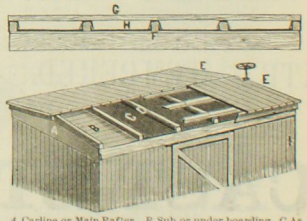


LEVER,
COMPOUND LEVER,
AND
Screw Jacks.

We make 27 varieties of these Jacks, and have more in process of construction.
Send for illustrated Catalogue and Price List.

WINSLOW'S
PATENT CAR ROOF



A Carline or Main Rafter. *B* Sub or under boarding. *C* Asphalt Felt, and when on Car painted with imperishable Asphalt paint. *D* Felt Cap or Sub Rafter. *E* Upper board roof. *F* Sub Rafter. *G* Stringers on Sub Rafters. *H* Air Space between the Felt and upper board roof.

This Roof must come into general use by Railway Companies and Manufacturers of Stock and Freight Cars for two reasons, CHEAPNESS and DURABILITY, as it can be furnished on the cars at the cost of a first-class double board roof, and is more durable than the best metallic roof, being thoroughly protected by the upper and lower boarding and the FELT, which is treated in its manufacture with ASPHALT and painted with the same imperishable material, which, not being affected by either *heat* or *cold*, must last the ordinary life of a car.

MANUFACTURED BY
A. P. WINSLOW & CO.,
CLEVELAND, OHIO.

LOWE'S METALLIC PAINT COMPANY,

CHATTANOOGA, TENNESSEE,

MANUFACTURERS OF

LOWE'S METALLIC PAINT!

This Paint has now been before the public sufficiently long to establish its qualities as first-class Metallic Paint in every respect.
It has covering properties superior to any other Metallic Paint made.

It takes about 18 per cent. less Oil than any other Metallic Paint.

It is absolutely free from Sulphates of every kind and description, which in many other Metallic Paints prove so injurious to Iron and Tin Roofs.
It is manufactured in a very superior manner by being re-ground and carefully prepared, and is entirely available for inside finish when dark colors are desired.
Its natural color is a Uniform Dark Blood Red. It is

Warranted not less than 55 per cent. Metallic Iron,

thus giving it a body excelled by no other Paint made.
Its Fire Proof properties are excellent, and houses constructed of wood, and especially shingle roofs, are very materially protected by application of this Paint.
It is not calcined nor burnt, consequently its color is unchangeable.
We have Freight arrangements to nearly every city in the United States and Canada, and would name Prices delivered.
Please read the Certificates hereto attached.

East Tennessee, Virginia & Georgia Railroad—Main Stem. / Office of General Superintendent, / Knoxville, Tenn., April 18, 1881.

S. B. Lowe, Chattanooga, Tenn.:
Dear Sir: * * * I will say that this company is using it both upon its Main Stem and Selma Division, and has found it perfectly satisfactory, and equal to any Lehigh Brown that we have used. It mixes well and spreads smoothly, and I find it much the cheapest paint that I can use for freight cars and such purposes. Very truly yours,
JNO. F. O'BRIEN, Gen'l Supt.

Wilkins, Post & Co., Engineers and Bridge Builders, / Atlanta, Ga., and 102 Broadway, N. Y. / Atlanta, May 16, 1881.

S. B. Lowe, Chattanooga:
Dear Sir: We have been using your paint on all the iron bridges that we are constructing on the M. & C., Georgia Western, and other railroads through the South, and find it of very superior quality *requiring less oil* and working with ease, and having excellent covering properties.
Respectfully, WILKINS, POST & CO.

Office of Peaslee, Gaulbert & Co., Manufacturers of / White Lead, Colors, Ready Mixed Paints, etc., / Louisville, Ky., April 15, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:
Dear Sirs: * * * Your Metallic Paint has given perfect satisfaction wherever we have placed it. In grinding we find it takes from ten to twenty-five per cent. less oil than various other brands of oxide of iron we have heretofore handled.
Very truly yours, PEASLEY, GAULBERT & CO.

King's Iron Bridge & Manufacturing Co., / Cleveland, O., May 23, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:
Gentlemen: We find your paint of first-rate quality for our use, and very economical. Yours truly,
KING BRIDGE CO.

Office of Scott & Co., / Manufacturers of Scott's Sheet Iron Roofing, / Cincinnati, May 4, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:
Gentlemen: We consider it as good as any that we have used during our experience of over nine years, and shall use it largely. Yours, etc.,
SCOTT & CO.

W. G. Hyndman & Co., / Manufacturers of Patent Sheet Iron Roofing, / Cincinnati, May 3, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:
Gentlemen: The paint which we received from you last month has given us perfect satisfaction. We regard it as the best iron ore paint that we have ever used.
Respe tfully yours, W. G. HYNDMAN & CO.

P. S.—Please forward us immediately two (2) tons more on our order.
Wason Car and Foundry Co., / Chattanooga, Tenn., May 3, 1881.

S. B. Lowe, City:
Dear Sir: For some time past we have been using the Lowe Metallic Paint upon all the cars built at our shops, and, as it gives entire satisfaction to our customers, it is our purpose to continue the use of it. F. F. MORRILL, Sec'y.

Cincinnati, Hamilton & Dayton R. R. Co., / Operating the / Dayton & Michigan, Cin'ti, Richmond & Chicago, / and C. H. & I. R. Rs. / W. H. H. Allison, Master Car-Builder / Cincinnati, June 14, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:
Gentlemen: We have been using your Metallic Paint on freight cars, at our shops, for the last four months, and find it a better paint than we ever used for that purpose.
Yours respectfully, W. H. H. ALLISON.

Laboratory of Fred P. Dewey, / Chemist to Roane Iron Co., / Chattanooga, Tenn., April 6, 1881.

S. B. Lowe, Esq.:
Dear Sir: I have given samples of your paint ore a careful analysis with a special view of ascertaining if there is any substance in it calculated to prove injurious to tin or iron roofs, and am free to say that I find it remarkably free from sulphides of every kind, or anything else that could prove injurious to either tin or iron roofs. Yours respectfully,
FRED P. DEWEY, Ph. B., Analytical Chemist

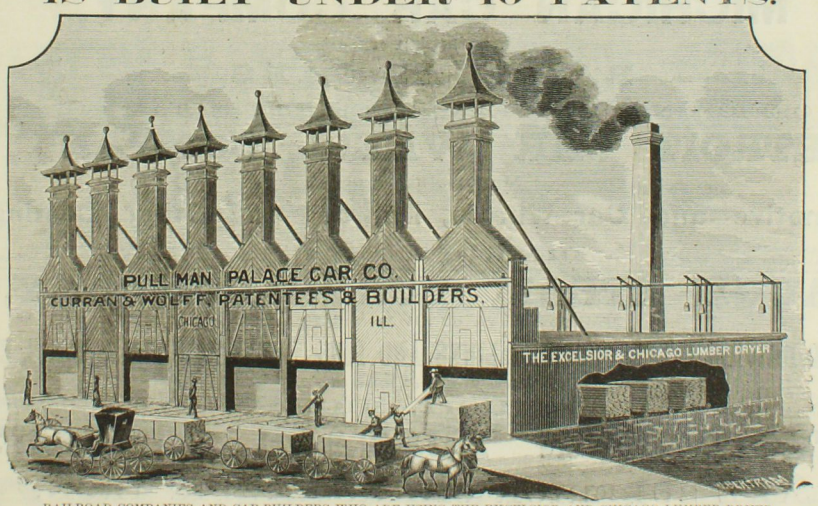
Office of Norton & Wieder, / Paints, Oils, Varnishes, Glass, Sash, Doors and Blinds, / St. Louis, May 30, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:
Gentlemen: We have used and sold—in the course of the past year—enormous quantities of your Metallic Paint, and we find that less oil is required for yours than for other Metallic Paints. Yours truly, NORTON & WIEDER.

THE EXCELSIOR AND CHICAGO LUMBER DRYER

IS BUILT UNDER 16 PATENTS.

PAYS FOR ITSELF EVERY YEAR. Storing Capacity, 40,000 feet Inch Lumber.



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Wells & French Co., Chicago	3
C. & N. W. Railroad, Chicago	2
Flint & Pere Marquette R. R., Saginaw	1
Peninsular Car Works, Detroit	1
Michigan Car Company, Detroit	2
Memphis & Charleston Railroad, Memphis	1
Ohio Falls Car Company, Jeffersonville, Ind	2
Indiana Car Company, Cambridge City, Ind	1
Haskell & Barker Company, Michigan City, Ind	1
Denver & Rio Grande Railway, Denver, Col	2
Atchison, T. & S. Fe Railway, Topeka, Kan	1
Barney & Smith Company, Dayton, O	4
Missouri Car & Foundry Co., St. Louis	4
Blain Bros., Huntingdon, Pa	1
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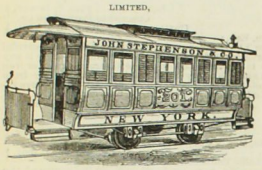
GILL CAR M'F'G CO.,

Columbus, Ohio.

Make the best CARS and WHEELS.

John Stephenson Co.,

LIMITED,



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Capacity 16 Cars Per Day.

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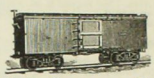

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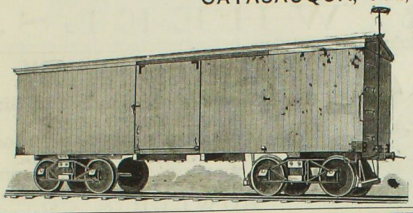

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For Freight, Locomotive, Truck, Tender, and Passenger Service.
Hammered Axles,
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CAPACITY:
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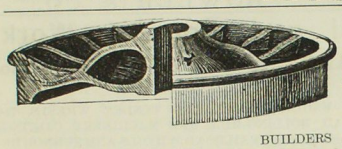
Wheels Fitted to Axles, and Prices Furnished on Application.



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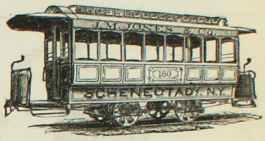

Our Cars have all Late and Valuable Improvements. Are noted for Light Running and Easy Riding. Combining Lightness and Strength with Beauty in Design and Finish. Our large Facilities Enable us to Fill Orders Quickly and at the Lowest Prices for Superior Quality.
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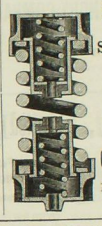

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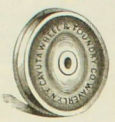

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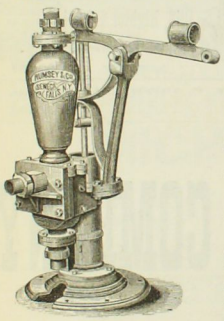

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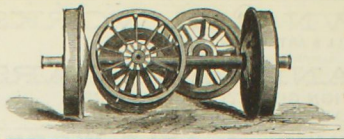

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Manufacturers of CAR WHEELS of all descriptions. Wheels and Axles, Chilled Tires; Engine, Car and Bridge Castings, of any pattern, furnished to order at short notice. Wheels of all sizes constantly on hand.
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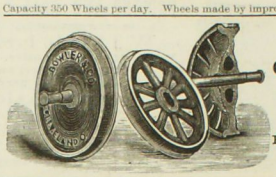

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Car Wheels of all Kinds and Sizes,
WITH OR WITHOUT AXLES.
CHILLED-FACED RAILROAD FROGS.
Street Railroad Turnouts.
ROLLING MILL AND MACHINERY CASTINGS.
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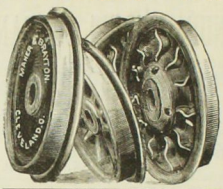

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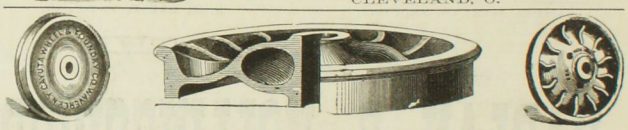

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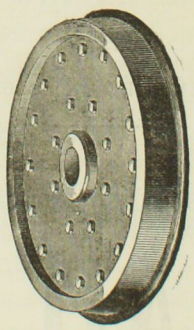
GEO. CHURCH, Pres't and Treasurer. W. W. SNOW, Sup't and Gen'l Manager.
RAMAPO, ROCKLAND COUNTY, N. Y.

ALLEN PAPER CAR WHEEL CO.,



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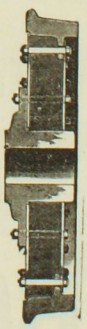
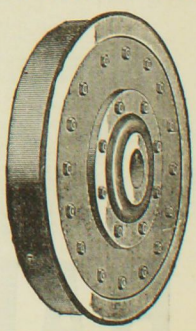


PAPER CAR WHEEL,
ALL SIZES.



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Especially adapted for Sleeping and Drawing-Room Cars, Locomotive and Tender Trucks. Steel Tire with Annular Web—Strongest, Most Durable, and Most Economical Wheel in use. Works at Hudson, N. Y.; and at Pullman (near Chicago), Ill.
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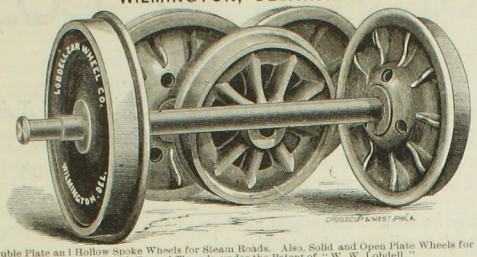

Single and Double Plate an 1 Hollow Spoke Wheels for Steam Roads. Also, Solid and Open Plate Wheels for Street Roads. Wheels with Turned Threads, under the Patent of "W. W. Lobdell."

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PLANISHED SHEET IRON

Patented March 14, 1865; April 8, 1873; Sept. 9, 1873; Oct. 6, 1874; Jan. 11, 1876.

Guaranteed fully equal, in all respects, to the

IMPORTED RUSSIA IRON,

And at a much less price.

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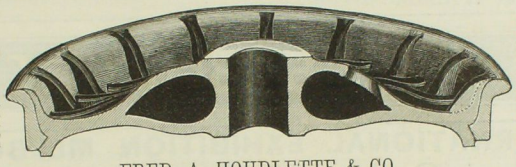

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DURABILITY.—With these advantages of material and construction,—embracing the tenacity, hardness and durability of the *Best Cast Steel-Tired Wheels—we claim* that they will do as much *hard work* as any Steel Wheel now in use, and with less danger to life and property, and are ready to guarantee them to that end.

USES.—They are adapted to any service and to all places where Steel Tired or the ordinary Chilled Wheels are used, while the *Cost* (being on a small percentage over chilled wheels), compared with their *mileage*, makes them the *cheapest Wheels* on the face of the globe.

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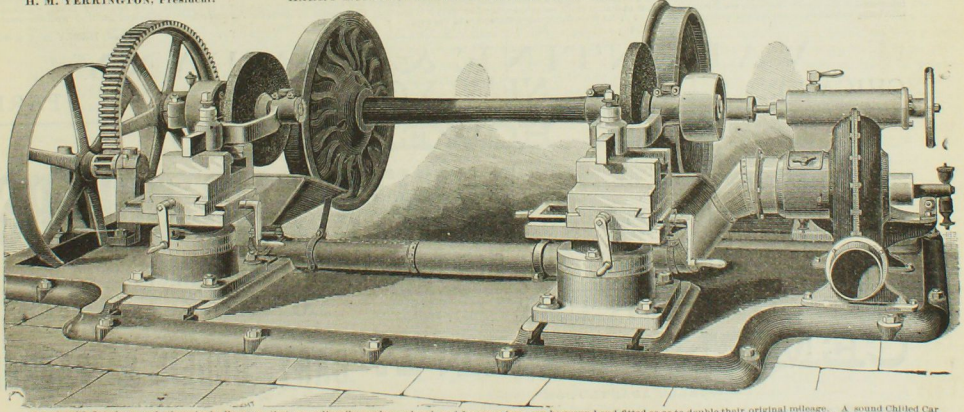

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GENTLEMEN: By this we have the pleasure to inform you that your exhibit of Varnish has the honor to rank in the highest place in our International Exhibition, and stands alone for the first Order of Merit for Varnish by itself without any other goods to help it; and it is the only Varnish that has obtained *First Order of Merit against all comers.* We congratulate you upon the position you take, for the competition was great. Some of the English makers have magnificent shows, got up regardless of expense, and you may fancy we have been interested in the result, but were confident; and what makes it more valuable is the fact that it is the only First Order of Merit for Varnish *alone*, which was secured without your Varnish being exhibited in connection with other goods, to make the exhibit more attractive to the eye. * * *

Yours truly, (Signed) HENRY BOX & SON.

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national Exhibition, and stands alone for
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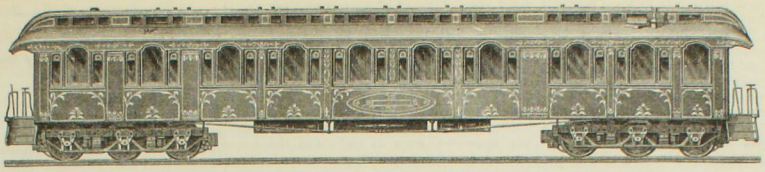


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XII
NUMBER 11

NOVEMBER, 1881.

SINGLE NUMBERS, TEN CENTS.
$1.00 PER ANNUM.

Miscellaneous Items.

THE Pittsburg Locomotive Works have booked an order for ten standard-gauge locomotives for the Pittsburg & Western road.

IT is reported that the Terre Haute Car Company and the Indianapolis Car Works are about to consolidate, the former removing to Indianapolis.

IT is said that J. M. Jones & Co., street car builders, at Schenectady, N. Y., are about to enlarge their works so as to build railway passenger cars.

THE Muskegon (Mich.) Car and Engine Works, organized six months ago, have a monthly pay roll of $5,000, and expect to complete $100,000 worth of work this season.

A CORRESPONDENT writes to us that the joint ring for smoke stacks, described in September CAR-BUILDER, was patented two years ago, but does not vouch for the validity of the patent.

FONTAINE locomotive, No. 2, is running on the New York Division of the Pennsylvania R. R., preparatory to a test of speed with one of the fast trains, which will take place when the working parts of the new engine are worn smooth.

THE Ensign Manufacturing Co., Huntington, W. Va., are constructing car shops. They have been for several years making car wheels, which industry has expanded from a capital of $60,000 to $260,000, and now they propose to build cars.

THE first annual report of the Railway Young Men's Christian Association, of Kansas City, Mo., shows that the organization has been very successful in promoting the social, moral and intellectual improvement of railway employés. The report is for the year ending Sept. 1, 1881.

IT is said that locomotive works are to be established at the new town of Pullman, near Chicago, the general plan of the buildings being in keeping with that of the car shops. The works will cost about $500,000, and when in operation the Pullman Co. will be capable of building a complete railway train.

THE car spring works of F. M. Atkinson & Co., of Chicago, have been purchased by the Chicago Tyre and Spring Works, which will continue the manufacture of springs, in connection with that of cast steel tyres for locomotives, the latter being a new enterprise which will be in full operation in about thirty days.

THE Lima Car company has just been organized at Lima, O., with a capital of $250,000, to engage in exclusive manufacture of freight cars. The president of the company is Mr. C. S. Brice, who is also vice-president of the New York, Chicago & St. Louis Railway Company. The works will occupy fourteen acres of ground and will consist of six large buildings

MORRIS SELLERS & Co., proprietors of the Chicago Splice Bar Mill, have ordered new furnaces and machinery for their works, amounting to $10,000, which, with their present capacity, will enable them to put out the coming season 8,000 tons of splice bars. At present they are turning out 6,000 tons of splice bars a year, and have orders on their books for 2,000,000 more.

THE Washburn Car Wheel Works at Worcester have just finished putting in six new steel crucible furnaces at their shops, more than doubling their former capacity. The company have also placed a new 25-inch cylinder on their striking hammer. The latter has a blow power of six tons, and is used in cutting out the center pieces from the steel ingots as they come from the furnace.

THE New York & New England road is building at the Norwood shops 8 baggage cars, 2 of them being 60 feet in length, and the rest 30 feet. The long ones have four 1¼ in. longitudinal trusses, and bridge trussing in the walls. They are to run on 4-wheel trucks. During the past summer there have been built at these shops 14 passenger, 4 combination and 130 box cars.

SOME of the New York Central passenger coaches are being provided with a scuttle escape in the roof for the escape of the occupants in the emergency of accident. Two or three are constructed in each car, according to length. When a car is turned over at an angle of 45 degrees, the scuttle will open and allow ample escape from fire or water, and without necessitating the breaking of glass.

THE Wabash, St. Louis & Pacific road is building at their Peoria, Ill., shops, a special car for W. F. Merrill, Gen. Supt. of the Chicago & Iowa Division. The body is 51 ft. long and 10 ft. wide. The side windows are 22 × 34 in., and the end windows (one each side of the door) 20×44 in. The inside is finished in ash in Queen Anne style. Between the parlors at either end are a private room, kitchen and sleeping room, with four berth sections, the lower berths folding up and forming easy chairs.

THE Illinois Central car shops at Chicago are building four suburban coaches with bodies 45 ft. long, the same style as the previous 26; 2 coaches, with bodies 48 ft. long, for the main line, and 100 8-wheeled coal cars, capacity 25 tons, to be used on the track-dump at Cairo, Ill. This dump is a piece of track constructed on rockers, which are worked by a hand-wheel to dump one car at a time. The locomotive shops are just finishing the last of a lot of 10 moguls, and have commenced two 4-wheeled switching engines, with cylinders 16×24 in., boilers, 46 in.; fire-boxes, 54 in., and drivers, 4 ft. They will weigh 30 tons in working order, and will have the lime-filter, crown-sheet washer and the new throttle-valve and eccentric lever, which have become the standards of this road.

THE Cleveland Bridge & Car Works, instead of using "horses" and scaffolding in working about cars in the erecting shop, make use of a substitute which is found to be an improvement. It consists of standards or posts, 2 × 4 in., placed in pockets mortised in the floor and in the beams overhead. Upon these standards are brackets or arms of 4 × 4 × 24 in. timbers with mortises 2 × 4 in. about 3 in. from the end. A bolt is put through the short end of the bracket to prevent its splitting. These brackets can be slipped up and down, and are held at the required height by ½-inch iron pins inserted in holes through the standards, and planks laid upon them to form the scaffolds. Eight standards are used to a car—4 on each side, or 2 on each side of door. When using two planks, the scaffolds each side of door are independent; but a third plank across the door reaches the whole length, and in connection with one across each end, makes a continuous scaffold all around.

IN 1880 the New York Central road built 34 passenger cars and 272 freight cars in its own shops, and had 3,000 freight cars built elsewhere. It also purchased 37 new locomotives. Its equipment at the end of the year was 639 locomotives, 345 first-class and 93 second-class passenger cars, 162 baggage, mail and express cars, 2,292 4-wheel, and 17,103 8-wheel freight cars; total number of cars, 19,995. It has 61 machine and car shops and 50 engine houses, with stalls for 592 locomotives. In 1880 its 639 locomotives hauled its trains 22,222,775 miles, making an average mileage of 33,055 miles to each engine. It carried 8,270,847 passengers, who rode 330,802,223 miles, each passenger going an average of 40 miles. This was equivalent to carrying 447 passengers each way over the whole of the road, main line and branches, every day. It ran 127,244 passenger trains, which is an average of 348 trains a day, each carrying 65 passengers. For carrying a passenger one mile, the average amount received was 1.99 cents, the cost of carrying was 1.26 cents, leaving a profit of 0.73 cents. It carried 10,533,038 tons of freight, averaging 239.7 miles per ton. It ran 48,250 freight trains, being an average of 132 each day; and each train carried an average of 218.3 tons. This is equivalent to carrying 3,460 tons of freight over its whole road each way every day. For carrying a ton of freight a mile, the average amount received was 0.87 cents, the cost of carrying it was 0.54 cents, leaving a profit of 0.33 cents.

THE Pullman car shops, at Pullman, have secured the order for the passenger train equipment of the New York, St. Louis & Chicago road, which, with that of some connecting roads, make a total of 200 cars, all of which are to be novel in construction and exterior finish, and models in many respects. Besides these they have orders for 70 passenger cars distributed among the following roads: Union Pacific, Chicago & Eastern Illinois, St. Paul, Minneapolis & Manitoba, Toledo, Delphos & Burlington, International & Great Northern, Texas & Pacific, and Morgan's Louisiana & Texas line. They also have orders for hotel cars for England and parlor cars for France, to be finished inside after designs characteristic of the country in which they will run. The shops have all the work they can do for twelve months. The Detroit shops have 84 sleeping and official cars in hand. They have just ship-

ped three elegant parlor cars to the Cincinnati Southern, and a business car to the St. Louis & San Francisco Railway. The latter is 55 ft. long and contains an observation room, a private office with sleeping and toilet room adjoining, a room with 4 berth sections, a lavatory, a heating room, a kitchen and servants' accommodations. The inside finish is mahogany decorated with inlaid work of the latest Pullman designs. It has the Pullman standard 6-wheel trucks with 33-in. paper wheels.

THE Detroit, Mackinac & Marquette road has received six new locomotives from the Baldwin Works, and eight more are being built at Paterson. The Michigan Car Co. is also building for the road 150 flat, 100 box and 1,000 ore cars. The passenger equipment is also to be increased by two express, two baggage and four coaches. The line will be opened in November from Marquette to St. Ignace, a distance of 152 miles. The Haggus water elevator is used in supplying water to tenders from under-ground frost-proof tanks, a method which saves $20,000 in original outlay for tanks and apparatus. There is also a saving of some $6,000 a year in maintenance, fuel, attendance, etc., with no trouble from the freezing of valves and pipes. The elevator consists of a spherical-shaped injector, without valves or movable working parts, placed under the right-hand cab bracket of the engine, and connected by 4-in. pipes to an under-ground tank and the right leg of the tender, and to the boiler by an ordinary steam pipe. After the connection is made to the underground tank the steam is gradually turned on. The vacuum produced by the condensing steam draws the water through the supply pipe into the injector, from which it is thrown into the tank at the rate of over 400 gallons a minute. If the engine has the usual working pressure of steam, and the blow-pipe is opened, the tank will be filled without reducing the boiler pressure, and the temperature of the water in the tank will be raised from 20 to 30 degrees.

THE Jackson & Sharp Company, of Wilmington, Del., have built a passenger car specially for exhibition at the Atlanta Exposition. It is 50 feet in length. The outside is painted in lake, with two shades of green, and ornamented in Eastlake style with colors which harmonize nicely. In the center panel is the coat of arms adopted by the cotton exposition, representing a crown and a cotton plant in full bloom twining around it. The letter-board of the car, where the name of the road to which cars belong is usually put, bears the name of the builders instead. The trucks are of the M. C. B. standard; the springs were made by James P. Hayes & Co., of Wilmington, and the platforms, which are Janney's patent, are provided with plated hand-rails. The finish of the interior is entirely of mahogany; not a vestige of any other wood is to be seen. The wood-work is handsomely carved, representing vines and flowers, and the decorations on the panels above the line of the windows is very chaste and attractive, combining a harmony of detail and an elegance of finish that shows to a decided advantage on all sides. The head-lining is exquisitely done, and is in perfect keeping with the high order of the rest of the work. The car is fitted up in costly and luxurious style. The glass is all of the very best, and that of the doors and ventilators is handsomely engraved. It is lighted by three double-light chandeliers. The attractive basket-racks are of a new design, and the seats are easy and comfortable.

THE Wisconsin Central road has converted two ordinary passenger coaches, 50 feet long, into sleepers, to run between Milwaukee and Appleton, by putting the seats further apart and placing them in pairs. There are 10 pairs on one side and 11 on the other, making 21 lower berths and no upper ones. The seat-back arms are made about six inches longer than the ordinary ones, with a notch to hold the backs in their usual position; the arm from the notch to the end is slotted, so that the backs of the two facing seats can be moved twelve inches further apart when the bed is to be made up. Rattan seating is stretched over frames the size of the berths. These frames are carried in a closet during the day and laid upon the seats at night and the mattresses spread over them. The mattresses, bedding and curtains are carried during the day in boxes under and between the pairs of seats, which are placed back to back. The berths are separated by curtains hung from the roof down between the seat-backs, and curtains are hung from rods in front in the usual way. The windows have curtains hung with rings and rods. At the top of the alternate window panels are Creamer ventilators. At the end of the car is the saloon, which was in the car before it was changed. Opposite is a large box stove for burning wood; at the other end of the car is another stove; opposite this are the ladies' and the gentlemen's toilet rooms and the closet for the bed frames. At each end of the car behind the seats next to the closets are boxes for bed linen. These cars are very popular, and are preferred to the regular sleepers on account of their comfortable beds and good ventilation, and the absence of upper berths. The charge for berths is the same as on ordinary sleepers.

THE North Milwaukee shops of the Chicago Milwaukee & St. Paul road are building 3 postal, 6 baggage, 4 express and 50 caboose cars. The postal cars are 60 feet long inside, and have Harrison's patent distributing racks. The baggage cars have bodies 50 feet long and 6-wheel trucks with 33-inch wheels. All their baggage, as well as sleeping and parlor cars are equipped with 6-wheel trucks, the question of safety being considered paramount. The express cars have bodies 45 feet long and 4-wheel trucks with 8-foot wheel-base. The caboose cars have bodies 30 feet long, 30 of them have a conductor's room occupying about 6 feet of the length of the car at one end. This room has a desk in one corner and cupboards in another. Next to it are the two raised floors 5 feet long, with two revolving chairs in the clear-story. The rest of the car constitutes the main room. It is 18 feet long and has sofas on both sides of the car, and a water-closet in the corner. There are two small side-doors near the middle of the car next to the raised floors, and doors opening from the main room make the spaces under these floors convenient for storage. The other 20 cabooses will be of the same general plan, except that the main room will have 4 swinging berths and adjustable seats that form beds. These can be used as drovers' sleeping cars. All the cabooses have compound brakes on all the wheels, which can be set from either platform or in the clear-story. The trucks are the same as the road's standard freight car truck, except that the wheel-base is 6 instead of 5 feet, and the springs are more elastic.

They are building a new snow-plough like the one they have used for more than ten years. The plough is built upon the end of a strong, specially built freight car, weighted down with iron rails in the floor. When in use, the edge of the plough is carried upon chilled cast shoes that slip upon the rails and hold it just above them. The plough can be raised and lowered by a gearing of chains and wheels like those of a hoisting pulley, and all of which are worked by a regular pilots' wheel. A sword-edged plate of iron between the top and bottom points of the plough cuts the snow crust two or three feet in advance of the molding board.

This road is discussing the expediency of changing the color of their passenger cars from ochre to some darker color that will better bear the grime and soot of bituminous coal.

The Progress of Car Painting.

[A paper read at the twelfth annual Convention of the Master Car Painters' Association, held in New York Sept. 21, 1881, by Mr. R. McKeon, of the New York, Pennsylvania & Ohio Railroad.]

Gentlemen of the Convention: There is no branch of business at the present day, and in these progressive times, that requires more study, greater patience or a closer attention than that of car painting; nor is there any part of car construction in which the mechanical effects are more apparent, or where there is the same opportunity to show good taste and exhibit wise judgment in the finish.

The painting of a first-class railway car is of more importance than many who know nothing practically of the work are willing to admit, and of late years it has called forth more attention than was given to it twenty-five or thirty years ago. There has been and is still a growing demand for something new and attractive to the American traveler. If a car is wanting in style and cheaply finished, the patrons of a road will be the first to discover it, while on the other hand, if the passenger equipment is kept up in good taste, attractive and neat in its general appearance, it meets with public approval and draws travel to that road, not only in its regular traffic, but the tourist and those in search of pleasure and recreation are drawn to it by a moderate display of the painter's art, exhibited not only on the interior finish but on the outside of the car, which is generally a fair indication of the comfort and luxury to be found within.

The painting, like any other part of the work in the finish of the car, is something that can be improved upon, but, to advance it, requires practice and a thorough study of the true principles which underlie the whole system. A practical and progressive workman will first aim to have his work do good service; he will give this—which is the main object sought for in painting—the preference over beauty of appearance, and more especially where his work is to be exposed to the weather, as the outside painting is on our cars. This is of the utmost importance and should first be taken into consideration, so that he may turn out durable as well as beautiful cars.

We should endeavor to produce that which will do good service, and not, as is the practice of some painters, make decoration their principal study. How often we see decoration overdone in the interior of the car, as well as on the outside. Such exhibitions of fancy we cannot call progression in the art; true progress may be found in that work which is made to look cheerful, quiet, expressive and durable in style and finish.

Master painters who are earnest in their desire for information will be found constantly seeking for improvement. They desire to advance; they will not content themselves with the plans, nor in the adoption of the methods by which other painters have claimed success, but they will be found studying out for themselves by practical tests in the paint shop, and by noting the results, obtain positive evidence of the advantages, and the value of the methods followed by them in the painting of a car.

We should not, even here, confine ourselves to our own observations, nor to what we have learned by practice, but go back years in the work and see what has been accomplished by our predecessors.

For any of us to form new plans or establish modes of doing work independent of what has been done in the past in car painting, is an act of folly, for if we aim to succeed in it, we should not respect the long years of practical experience given to the work by our old painters, nor should we refuse to give their methods due consideration.

A large amount of valuable information has thus been exchanged at the meetings of this association, which, to-day, is waking up the car painters throughout the country.

There is value in the accumulated knowledge of long years of study in the paint shop, and in the testing of the various pigments employed in car painting. Here we may ascertain by study and experiment, and by a frequent and careful examination of the cars in service on the road, what are the causes of decay, and what formulas may be changed in the preparation of the paints which promise better results.

I do not purpose, in these general observations, to enter into any minute details as to the methods employed either in the past or at the present time, but merely to look over the ground, taking a general view of the subject as we understand it. It is not my intention to lay out a rule for others to follow; all car painters have their own peculiar notions in regard to doing work, and some are undoubtedly honest in their views, while others years ago inherited the experience of their fathers, which was of value to them had it been cultivated, but they thought it sufficient, and consequently make no effort to improve what little talent they possess.

You do not find many of this wise class attending Painters' Conventions; such think they know all the secrets of the trade and are not willing to let what little light they have on car painting shine out for the benefit of their fellow craftsmen. We cannot look for progression here; such men are wedded to their old methods of painting a car, and they will not be convinced that this is in reality an age of progress and that the art is advancing. They never look outside of their own shop, they do not know that the world moves and that their plan of painting is a very expensive one; they will hardly believe it, when told that the expense of doing good work has been reduced one-third in the past ten years, and better painted cars are turned out to-day with seven coats of paint than was done fifteen or twenty years ago with twelve coats, which was then the invariable rule. The expense of car painting has been gradually reduced, and to accomplish this, old plans and methods had to be abandoned to a certain extent.

There are none here to-day but are willing to admit, that in all branches of mechanical work, the reduction of labor is a saving and denotes progress. Of late years the process of painting a car has been simplified; we have done away with a large amount of unnecessary labor and the work is equally as well done. In days gone by the outside finish of the car was equal if not better than the inside. A very fine surface was the great object, and no job was considered complete without a fine gloss, free from any defects; the result of this was a large amount of labor with no real benefit to the wear of the car or to our railway companies.

In painting a car, durability can be secured without a great expense, but good judgment is necessary in the matter of time and in the proper mixing and application of the colors employed. Some will ignore past experience in this, while others may think in their own minds that they have discovered the straight road to perfection, and they desire no aid or assistance. Within their own fertile brain lie the whole secrets of the trade; but we believe that the most successful are those who think it best to improve on the past experience of old painters, which is of great help to us if we desire to attain satisfactory results.

The onward march of progress has perhaps a deeper hold on our western car painters than on those of the east. If we were not somewhat modest, which is one of our failings, we would call attention to our western roads as being far in advance of the eastern, both in the design and in the finish of their passenger coaches; the painter therefore has more room to show his ability and taste in the decoration and finish. We have examined the passenger rolling-stock of the several lines terminating in this city and its suburbs, and compared them with the same class of cars running into Chicago and St. Louis over the principal roads, and our decision given without partiality is in favor of the western lines.

We do not mention this in disparagement of our Eastern painters, for they are equally as able to design and execute as those in the West, had they the same opportunity; in fact the West to-day is indebted to the Eastern States for some of her most successful car painters.

But in noting the advance made we must give to the master car-builder a just share of the credit for the style and finish of our cars, for without a neat and tasteful design shown all through the construction, the painter's art would be lost on it, as there must be design and finish in the painting, appropriate to the style and finish of the woodwork to secure that harmony which gives to the car a beautiful and pleasing effect.

All car-painters have their own peculiar method of painting a car and they will disagree as to the proper mode of proceeding in the work; they are by no means unanimous in their views, and this we are pleased to see, as it points more clearly toward progression. Again, there are a class of painters who hold to an ancient custom: they would not dare to vary their plan of finishing a car; they cannot see where there is any room for improvement, while the wide-awake painter has eyes and ears, both necessary qualifications, wide open to catch everything relating to the business, and is willing to try new methods and to adopt what may be found of value after giving the practical tests necessary.

As we look back some thirty years we have a very clear recollection of the initiatory work in car painting; the paint-shop was the place where the colors were all ground, the paint muller and the small hand paint-mill were kept constantly in motion, and the apprentice to car-painting had exercise for his muscle. The trade was learned by commencing at the bottom round of the ladder. In the preparation of the colors we have advanced and made good progress; we can now have all our paints ground ready for use and of finer and better quality than could possibly be obtained in the dry state. The facilities for preparing the raw materials are nearing perfection, and, in fact, all the stock required in the paint-shop is receiving special attention in its preparation. There is a great saving by procuring colors in this way, providing we get them from reliable parties and of good quality. No waste around your shop, no old fatty color to use up, which is too often the cause of paint cracking; everything kept neat and clean, and uniform colors given you, thereby saving the annoyance from this source, which must arise from the mixing and grinding of the dry colors in the shop.

In the car-shop we are called upon to use certain pigments and liquids, but how few of us stop to enquire into the nature of them. Now it is one thing to know what mixture we apply for the protection of an exposed surface, but quite another matter to understand the composition and its adaptibility to the work. The car painter is generally deficient in knowledge as to the methods employed for detecting adulteration in paint stock, and a practical chemist must be consulted to show us the impurities therein, which is too often the cause of our work not proving satisfactory; it fails to meet our expectations, yet we must shoulder the responsibility when we may not be the cause of the failure.

Every railway car shop should have a chemist whose duty should be to examine all paint stock, and reject that which is not as represented. This plan is pursued by several of the larger shops in the country. Nor do the tests stop with the paint stock, but are applied to all departments of car construction, with profit to the company.

Our American varnishes have improved in the past fifteen years, and to-day we believe that nine-tenths of our car and carriage painters prefer them to the English; they have proved to be superior in quality and better adapted to the extremes of heat and cold which they are subject to in this climate. But a few years have passed by since it was thought that a good job of painting could not be done without English varnish—at least for the finishing coats; but a revolution has taken place, and to our master painters is due not a little of the credit for the great improvement in our American varnishes, as they demanded good stock, and our varnish-makers responded with increased facilities and large capital to the constant and increasing wants of the railway shop and the car and carriage manufacturers of the country.

There has been but little of what painters term the secrets of the trade made public until within the last few years. A favored few have tried to keep their fellow craftsmen in ignorance, but the Master Car Painters' Association is now giving to the fraternity at large the benefit of their long experience in the paint shop, and as they meet together annually each one is willing to give what practical knowledge he may have acquired to others, thereby assisting one another, and thus advancing the art. By these free interchange of views some pigment may yet be found that will supersede all others which have been employed, and a complete revolution take place in car painting.

This is the age of progress, and we look for something more permanent in both color and durability than the lead and minerals now in use, and the railway companies will be the first to receive the benefit of the painters' discovery in the reduced expense of maintaining their rolling stock.

The color of passenger cars has been subject to many changes in the past. They have been painted all shades from a white to a very dark brown. Thirty years ago and later, very light colors were popular, and until Pullman introduced the dark color, a linen or straw color was the rule; only in rare cases did we see a car painted dark, and occasionally some road used green, but in the last twelve years a number of roads have partially adopted a dark color, or what we may class as dark, as they are all shades from an Indian red to a very dark chocolate brown. There are but few roads that have adopted the dark color entirely, and we predict, with good reasons for such predictions, that a few more years' experience will convince those who are studying economy on our railways that the light colors are by far the best adapted for their passenger equipment; they may ignore the judgment of the painter for a time, but we can assure them that the day is not far distant when light colored cars will again come to the front, then the painter will have some satisfaction in turning out his work, knowing, as all do who have tested this color question impartially, that it will be creditable to the shop and will show good results as to wear and durability.

What advance has been made on the inside finish? This deserves mention, for here we have made rapid progress. By the old process of finishing it was tedious and very unsatisfactory. A cheap varnish was generally applied. Some two or three coats, quite heavy, were given and then scraped clean to the wood. This was the mode of filling at the time we first entered the car paint-shop in 1850. Then three coats of varnish were applied, and a large amount of labor was required in rubbing down to a good surface, after which

the work was completed with a flowing coat. Here were seven coats of varnish given to obtain a good finish on cherry or mahogany, which were the woods mostly in use for finishing at that time, while none of the woods used in car construction are more easily filled and finished than these. Bu the wave of progress came,and a wood filler,which lessened the expense fully fifty per cent., was introduced by a car painter. This filler has been improved so that we now take the raw wood, fill it by one application of the filler, and turn out a first-class finish with three coats of varnish, rubbing down only on the last coat, which leaves a fine surface and completes the job, which will wear better and appear richer than where it was finished with a full varnish gloss.

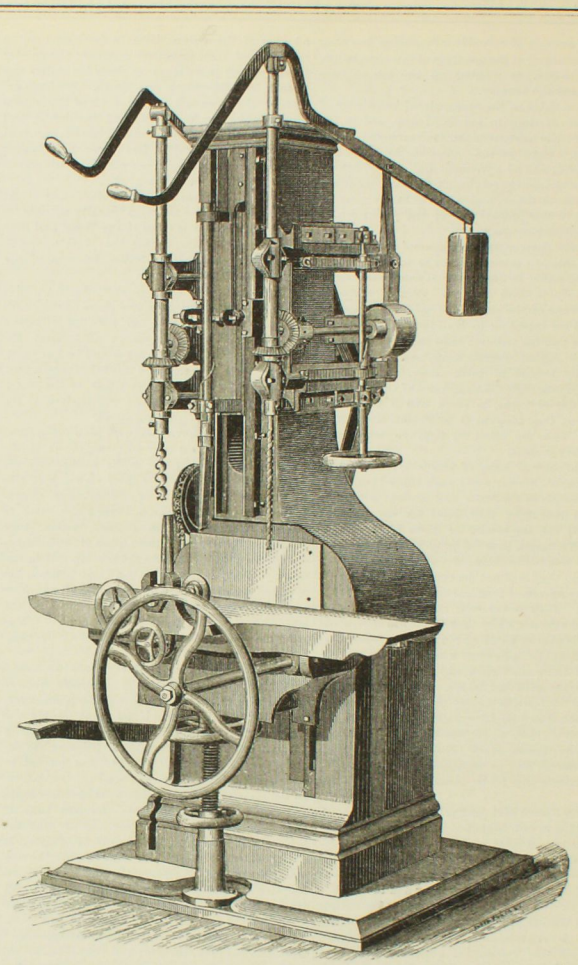
Allow us briefly to call your attention to the decorative work on cars. It is evident to an observer that this branch of car painting has been progressing ; the designs so artistically spread over the car body and head-linings show the best of skill and good taste, and that at a very moderate expense when compared with style of heavy Roman scrolling.

Landscape and figure painting, which was done so extensively on the best class of cars, has been entirely abandoned, or nearly so, and in their place we find handsome ornamental designs which are more appropriate and not so expensive. There are perhaps a few painters who still adhere to the old style of scrolling and the painting of pictures on their cars, and the only reason they can give is that they were thus taught, just as we find those who are unable to give any explanation for the methods they pursue in the painting of the car from the foundation up ; they have simply learned the alphabet of car painting and they strictly adhere to it. Can we look for progress here where there is no disposition to test others' methods or to improve on their own?

In closing this essay allow me to urge the master painter to acquire an interest in the management of his shop; let him survey the situation and study the routine of daily duty in detail; detect when he can any deficiences in the preparation of the material, as well as in its proper application at the proper time, and in a workmanlike manner by competent hands. Your success depends on giving this your attention, as many jobs of painting are spoiled with the best of material carelessly prepaired, and a want of good judgment shown in its being properly applied to the work on hand.

Improvement may be looked for in the work when the painter and the manufacturer of painters' supplies are better educated and the general principles of car painting are more fully recognized by all. We must be earnest in the search for more knowledge of the nature of the pigments employed and endeavor to be more successful in our work than our predecessors, because we have the advantages both of their and our own experience. Although the past may not always have given good results, still these experiences are to us an inheritence; they are the labors of the years gone by, and we may profitably employ them as valuable assistants to aid us in reaching more satisfactory results as to durability in car painting.

THERE are now 47 Pullman cars in service on English and Continental railways, and 10 more are in course of construction to be sent abroad. The first Pullman sleeper introduced in England commenced running on the Midland Railway in 1874. The English railway officials and the people generally predicted that the cars were too long to get around the sharp curves of that road, but after a trial had satisfied them that there was no ground for apprehension on this score, the English companies commenced building larger carriages than they had ever built before.



HEAVY CAR MORTISING AND BORING MACHINE.

THE machine illustrated in the cut is constructed on an entirely new, and what is claimed to be the only correct principle for heavy mortising machines. All the heavy working parts are placed at the base of the column, giving it great solidity and obviating the vibratory motion found in other mortisers. The gateway carrying the driving shaft is strongly gibbed to the base of the machine inside. This carries a heavy balance-wheel, which, by a pitman, transmits the motion to the chisel. All of these parts having to rise and fall are balanced by heavy weights hung inside the column. The power to bring the chisel down to the work is applied to a knuckle or elbow joint, which is pivoted to the top of the machine and to the balance-wheel gateway below. The joint is operated by the treadle, which connects with it by an eccentric wheel and chain in such a manner that the power required is gained in the exact proportion needed, instead of decreasing in inverse ratio, like most mortisers. The treadle has only to straighten the joint, which then becomes a straight bar, taking the entire blow of the chisel, while the operator has only to keep it in position by a light pressure on the treadle, making it actually easier than many light mortisers. The bed is strongly gibbed to the column, and raised by the screw in front, which, setting exactly under the chisel, gives great solidity. The top table is moved laterally by the large wheel to feed for the mortise, and the whole table adjusts transversely on ways for the position of the mortise. There are two boring attachments, one on a line with chisel to bore for the mortise; the other adjustable across the table 12 inches, with a drop of 15 inches, for general boring. The column is 7 feet high. The bed will receive timber 16 inches square; and the chisel has 8 inch stroke, and will mortise to the center of a 16-inch timber both in width and depth. With each machine are furnished 10 chisels with corresponding bits, of sizes $\frac{3}{8}$, $\frac{1}{4}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$ inch; also 10 long bits, $\frac{3}{8}$, $\frac{1}{16}$, $\frac{1}{2}$, $\frac{5}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{3}{4}$, $\frac{13}{16}$, $\frac{7}{8}$, 1 inch, and

also, as extras, any size of chisels and bits, by 16ths, up to 2 inch.

A detached counter-shaft is furnished, which should stand on the floor 8 or 10 feet to the right. The tight and loose pulleys are 10 inch diameter, 5 inch face, and should make 340 revolutions per minute. The base of the machine is 3½ feet square, and should set upon a perfectly solid foundation. Weight complete, 3,700 pounds. Power required to drive mortiser, 5 horse-power.

Belting required, with counter 9 feet from driving shaft, 22 feet of 5-inch belt, for chisel; 47 feet of 3¾ inch belt, for bits. Main driving belt should be 5-inch.

Manufactured by C. B. Rogers & Co., Norwich, Conn. Warerooms, 109 Liberty street, New York.

Names of Steel.

To the ordinary reader, the numerous names applied to steel are simply bewildering. He reads articles discussing the qualities of this most useful material, and encounters name after name which, conveying no definite idea to his mind, serve to increase his perplexity. They often leave him in doubt upon important points. It is true that writers occasionally stop to define a term, or describe the peculiar qualities and nature of the steel to which a certain name is given, but at the next moment they employ terms, by way of comparison or enumeration, which they assume the reader knows, because they have been before the public for a considerable period. This leaves him almost as badly off as though none of the names had been explained. The truth of the matter is that, owing to the numerous new processes and improvements in the manufacture of steel which have been introduced recently, the vocabulary has become greatly extended. The terms which were common a few years ago have become practically obsolete, or if now used are employed in a different sense from that to which our older mechanics became accustomed when learning their trades. A brief account of some of the most common names in use at present will be of service.

Blister steel is made by causing the carbon of charcoal to penetrate iron in a heated state. German steel is blister steel rolled down into bars. Sheet steel is made by hammering blister steel. Double shear steel is made by cutting up blister steel and putting it together and hammering again. Crucible steel is made by melting in a pot blister steel and wrought iron or unwrought iron and charcoal and scrap. Bessemer steel is made by blowing air through cast iron, burning out the silicon and carbon. Open hearth steel is made by melting pig iron and mixing wrought iron, or scrap steel, or iron ore to reduce the silicon and carbon.—*Blacksmith and Wheelwright.*

New Suburban Passenger Cars for the Boston & Albany Railroad.

Some new cars of this description have just been completed at the Allston shops of the Boston & Albany road, and are intended for the suburban traffic near Boston. An increased demand for rapid transit and more frequent trains has led to their construction. It was desirable that the cars should be light in weight and in appearance; and that a departure might be made from the present style of this class of cars, the services of Mr. H. H. Richardson, a prominent architect of Boston, were secured to assist in the finish and details, and the result has been the introduction of some features that are new, the utility and practicability of which are yet to be determined.

The train already completed consists of four passenger coaches and one combination, smoking and baggage car. The length of each car is 55 ft. 4 in., or 61 ft. over all, and 9 ft. 3 in. wide. The sills are of yellow pine, and end sills of oak, with posts of ash only ⅞ in. thick. The general appearance of the exterior is peculiar and unique on account of the large windows and style of finish. The outside covering is of narrow whitewood or poplar 6 in. wide, with ¼ in. center bead, and between beads is cut in convex form, giving the appearance of corrugation. There is no finish below the letter-board, which consists of two members, the letter-board proper, 9 in. wide, with a molding along the top 3 in. wide, above which projects the roof-board.

The windows are finished square both at the top and bottom, and are of different sizes. In the center on each side are 5 mullioned windows, equivalent to 10 single windows, each of which consists of two sashes, the top one measuring 15 × 27 in. and the bottom one, which is movable, 22 × 27 in. There are also 4 single windows on each side of the mullioned windows on both sides of the car, and two on the ends each side of the door, measuring one-half the size of the double windows, making the same as 40 large windows in the entire car.

A change is made in the deck, which differs from those built of late years on this road. The pitch of the roof from the outer edge of the car to the deck is less inclined, giving more room in the deck for ventilation. There are 18 deck windows on each side, of ground-figured glass, measuring 25½ × 10½ in. The sash is hung on a hinge at the end, so that each window opens alternately in opposite directions by means of an arrangement on the inside, so that ventilation may be obtained when the train is moving in either direction without catching the cinders and smoke by a change of windows. As an additional protection, a wire screen covers each pair that act alternately. Although the deck appears much higher, it is in reality no farther from the floor than in any car. On all passenger cars of this road the decks are built so as to barely clear the bridges, the measurement from the rail being 13 ft. 10 in. The deck finish between the windows is a plain panel without ventilators, and is in the same vertical line as the panels on the body between the windows. The top finish is a heavy bed molding, the roof projecting over about 4 in. and tinned down.

The interior is finished entirely in cherry. The head-lining is done away with, and in its place is a sheathing of cherry, finished in sunken and raised panels, the same being used between the windows. The main roof is in corrugated form similar to the exterior of the car, only in cherry. The window sash and blind frames are of mahogany and slats of cherry.

The saloon and Baker heater occupy the two corners in one end of the car. The ceiling is furred down, extending across the doorway and finished the same as the opposite end of the car, which consists of an insertion of the corrugated cherry, with the corrugation vertical and about 5 in. in width, in the plain cherry finish, giving a very nice appearance and slightly of the Eastlake style.

The seats are of rattan, and in place of the metallic band on the edge which is commonly used is a leather, buff-colored band, fastened with nails with solid leather-covered heads to correspond. The use of the leather band on car seats originated with Mr. George F. Small, of the upholsterers' department at these shops, and the nails are furnished by parties who invented a machine for their manufacture for this especial use. There are reversible seats on each side of the car seating 40 persons, and on the saloon end there are six seats on each side running lengthwise the car, and on the opposite end eight seats on each side. These are arranged in this manner at the ends to facilitate quick exits and also furnish more standing room.

The seat ends of the reversible seats are of cherry, finished plain, and in keeping with the tyle of the interior of the car, and not quite as high as the iron ones commonly used. The car is lighted at night by 16 side-lamps of a peculiar design, specially gotten up for these trains by the architect, as were the basket-racks, which are nearly twice the length of those now in use, and extend over two windows.

The bell-cord is suspended by metallic pendants, so that the top of the interior is notably free from any of the fixtures usually seen there. Ventilation is also obtained through each end of the deck by means of a wicket that admits a current of air through a screen under the hood. The doors are finished in cherry to correspond with the interior, with sunken and raised pannels running crosswise, and large plate glass in the top 34 inches long. All the metallic fixtures are nickel-plated, and all except the basket-racks and lamps were furnished by the Union Brass Company, Chicago, Ill. The others were manufactured expressly from the plans of the architect, by Williams & Page, of Boston. The baggage-room occupies 15 feet of one end of the smoking car, is finished in sheathing of cherry, and is headed by a coil of pipe under each wardrobe in the two corners near the smoking-room.

The trucks have 42-in. wheels, with steel tires, and wrought-iron centers and spokes. These wheels were made by the Patent Shaft & Axletree Co., Wensbury, Staffordshire, England, expressly for these trains. The axles are steel, and the wheel base 7 ft. The weight of each car is about 42,000 lbs., with the 42-in. wheels, or the same as 39,000 lbs. with 33-in. wheels.

The ornamentation of the cars is simple in the extreme, the body-color being the same as the standard color adopted by the road last year, a dark olive, with no striping, and plain "Boston & Albany Railroad" on the letter-board, with "Suburban Service" and the number of the car in the center under the windows; the letters are in nickel leaf shaded with red.

These trains are equipped with Miller platforms and buffers, and Westinghouse automatic brakes.

Reading Aloud in Cars.

Opinions may differ as to whether the man who chews tobacco, the man who whistles, or the man who eats peanuts is the worst offender, but it will be unanimously agreed by all intelligent sufferers that the man who reads a newspaper aloud is decidedly the most maddening of all traveling tormentors.

The wretch in question is of uncertain age. Sometimes he is a young man and reads accounts of prize fights and murder trials to an accomplice of few years and no understanding whatever; sometimes he is middle-aged and reads political speeches to a companion who shares his political views and his lack of decency, and sometimes he is an old man who reads the whole newspaper, with the exception of the advertisements, and relies on his gray hairs to save him from the vengeance of the public. Reading aloud in a railway car is, like falsehood or theft, the crime of no particular age, and any person who can read words of three syllables and is devoid of moral sense may become addicted to it.

It is a curious fact that the average criminal of this detestable class can seldom read with any fluency. He always stumbles over long words, and as to many simple and common words his ideas of pronunciation are extremely vague. In the rare cases where he does know how to read with comparative ease, the effect upon his helpless listeners is rather worse than it would be were he to stumble at every other line. His accomplice is sure to be unable to understand rapid reading, and always requests the reader to "just read that over again, won't you?" As between a man who reads badly and a man who reads well, but repeats the

offense indefinitely, there is little to choose: but inasmuch as the sufferer can partially relieve his mind by despising the ignorance of the former variety of wretch, he is perhaps a trifle less offensive than the latter.

The most disgusting feature of this crime of reading aloud on the railway is the fact that it prevents anybody else from reading. The ordinary male traveler likes to read his newspaper on the morning train, but it is impossible for him to read while within a few feet of him another man is reading aloud. It is difficult to know what to do with a nuisance of this kind. In Europe, when a man begins to read a newspaper in a railway carriage his fellow travelers usually kill him and throw his body out of the carriage window, and as the compartment of a railway carriage never holds more than eight persons, the number of avengers is so small that they can be trusted to keep the secret of the criminal's disappearance. Our saloon cars, however, are so large that summary justice could not be meted out to an offender with any safety, since there would certainly be some one of the 50 or 60 occupants of the car who would be mean enough to give information to the police. Probably the only way in which the nuisance could be legally and effectively suppressed would be a simultaneous reading aloud of 50 newspapers by 50 aggrieved and determined men.—*N. Y. Times.*

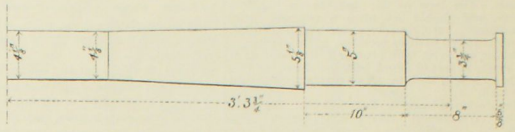
Track-Yards—A Model System.

The St. Paul, Minn., *Pioneer Press* says that Supt. Van Horne, of the Chicago, Milwaukee & St. Paul road, has devised a system of yard trackage for the road in Chicago, which, since its adoption, has been a wonder of convenience and safety in the handling of cars. The same methods have been provided by the company in St. Paul, and now it has the best yards in the city for the despatch of business without confusion, in quickest time, and of special benefit to merchants and other freight receivers. The main track of the company, used entirely by passenger cars leading to the union depot, has not a single switch upon it, so that it is not used by freight cars at all. Just south of it is another track for freight purposes, which branches off toward the river, east from the end of the new freight house. Between that track and the freight house is a fifty foot driveway for teams. On the south of the house is another track running along the river front, eastward down to the bluff. At the point of branching off by the freight track a series of connecting tracks begin, nine in all, that run to the bluff. At these points are switches by which cars incoming or outgoing can be located according to their destination in the making up of trains. If a train of cars comes in it can be run down to the particular track intended to receive certain specified cars. Cars for St. Paul will be by themselves, so also Chicago cars, western cars, cars for the various divisions of the road, etc. Thus the freight man can know just where to find cars wanted, teamsters can locate the cars they seek, and at the same time there is no interference with the passenger business, and no danger of passenger cars colliding with freight, and no waiting of the two sets of cars to be moved out of the way of each. By this system several hundred cars can be accommodated at once without any confusion. Some of the tracks are already in use, but the bad weather has retarded the general surfacing up. As soon as it is pleasant this work will be finished up, and then traffic will be put through in fine shape.

MR. CHARLES D'W. GIBSON, of New York, having become a partner in the railway car spring business of Cliff & Righter, the name of the firm has been changed to Cliff, Righter & Co.

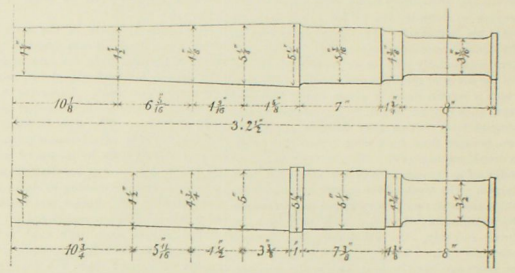
English Railway Axles.

The following diagrams of the dimensions of axles used on the principal English railways for carriages and freight wagons are copied from the *Railway Engineer* (London) together with a statement of the materials used in the manufacture of axles, and the tests to which they are subjected.



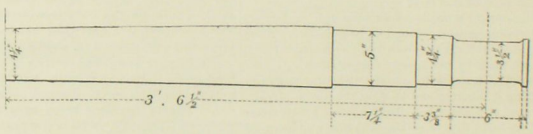
GREAT EASTERN RAILWAY.

Made of the best Bessemer steel. They are tested by being placed on two supports 3 ft. 6 in apart, and sustaining without rupture or permanent set, five blows from a ram weiging 2,000 lbs falling on center from a height of 20 ft.



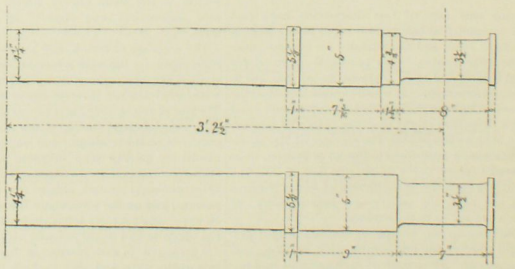
GREAT NORTHERN RAILWAY.

These axles are of steel and the best Yorkshire iron.



GREAT SOUTHERN & WESTERN RAILWAY.

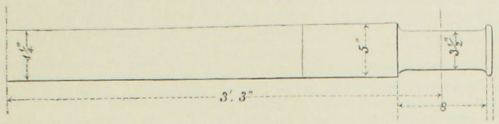
Axles for carriages are of cast steel, and are tested by being placed on two supports 3 ft. 6 in apart, and must stand, without rupture, five blows from a ram one ton in weight, falling on center from a height of 25 ft., the axle returning to its normal position after each blow. For wagons the axles are of Bessemer steel, tested on two supports 5 ft. 8½ in. apart, and must stand without rupture or permanent set, five blows of a ram one ton in weight, falling on center from a height of 10 ft.



GREAT WESTERN RAILWAY.

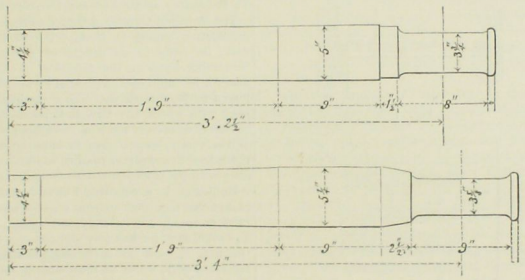
Made of iron of best quality. The process of manufacture is as follows: The rough mass of iron is flattened into bars 1 in. in thickness. A number of these are then piled together and hammered

into bars of 1¼ in. in thickness. A certain number of the latter are then placed together, heated and passed through the rolls; then reheated and forged into straight bars of a circular section a little larger than the diameter of the axle, which are finished off to the required dimensions under the steam hammer. Any axle having the least flaw is rejected. They are then tested at the machine shops of the company, and invariably give good results.



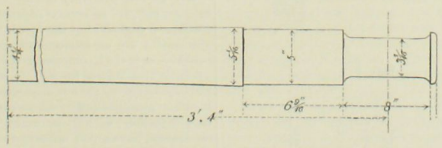
MIDLAND RAILWAY.

Made of Bessemer or Siemens-Martin steel. Bessemer axles for carriages and wagons must support, without rupture, five blows from a weight of 2,000 lbs. falling on centre from a height of 20 ft., the axle resting on supports 3 ft. 6 in. apart, and must return to normal position after each blow. The testing is then continued up to breaking point.



LONDON, CHATHAM & DEVOT RAILWAY.

Made of wrought iron only for carriages andwagons, and tested by falling weights to prove their elasticity.



SOUTHEASTERN RAILWAY.

Made of best quality of Bessemer steel, and also of Yorkshire iron, and must stand, without rupture or permanent set, five blows from a weight of 2,000 lbs., falling on center from a height of 20 ft., the two supports being 3 ft. 6 in. apart.

The London & Southeastern Railway use crucible steel and Bessemer steel, and the London & Northwestern, Bessemer and Siemens-Martin steels, for axles, with tests similar to the foregoing. According to the information furnished by the companies in 1880, it appears that steel, either crucible-cast, or from the Bessemer or Siemens-Martin processes, is largely employed in the manufacture of the axles, and almost exclusively for the tires of locomotives, tenders, carriages and wagons. The tests of strength for axles are of the kind above indicated. The tires must bear under hydraulic pressure a diminution of about one-sixth of their diameter without rupture or crack. For the steel used, the companies prescribe in their specifications the only makers from whom it will be accepted.

Communications.

Master Car-Builders and Master Mechanics.

To the Editor of the National Car-Builder:

In your last issue there are two letters, both written apparently by one hand, referring to master car-builders and master mechanics and dealing with their responsibilities and capabilities. There is nothing easier for an outsider to do than to point out faults and defects in this thing and that thing, and to show, from his standpoint, how this should be done and how that could be improved. But the knowing of either one or other does not prove that if the fault-finder had the management of either department he would make matters look different. In some respects he might improve appearances on the principle of the old adage that new brooms sweep clean. But the probability is that, after a trial, the thousand and one difficulties which beset a man in carrying out any good intentions, would begin to operate and draw him into the same rut that his predecessors had been running in. Be that as it may, however, I would like to say a few words in defense of my brother master car-builders, the majority of whom, I doubt not, if they could control matters in consonance with their desires, would soon put their vetoes on systems that now are rampant. In the first place, there are very few, if any, of us who have an unlimited purse to draw from, and consequently we must use our means accordingly; for if by any chance our outlay exceeds the limit allowed us, some pretty close cornering is sure to be the result; and it is not unreasonable that it should be so, for unless the dollar is earned we can hardly expect to have it to spend; therefore much that we should like to see done must inevitably remain undone.

Then again, referring to the special complaint made as regards the loose inspection of cars, the present day is so pregnant with the system of interchanging of cars with those from foreign roads, that out of every hundred cars running, probably from sixty to eighty per cent. are foreigners, for which it would be more than human to expect that we should give more than passing attention to see that they are in fair running order, and likely to pass safely over our respective roads. Every day experience shows that this is a fact, and I do not hesitate to say that there is not one road in fifty that would voluntarily replace an old draw-bar, a much worn brake shoe, or a brass, if the old one would hold out long enough to pass muster under the lynx-like eyes of inspectors.

Under such circumstances, is it to be expected that any car service will be maintained in such condition that fault cannot be found with it? However desirable it may be to interchange cars with the intent of preventing freight from being broken in bulk, the system is, nevertheless, one of the greatest resultant evils that any railroad has to encounter in the way of keeping up its cars to a standard of excellence, and consequently it tends to blunt the conscience of many a good man, who, under a better system, would gladly devote all his energies to the improvement of his own stock.

It is poor encouragement to the man who would keep his cars in first-rate order, to know that the bulk of them will be running over everybody's road but his own, it may be for months, when they will again make their appearance in such a shape, perhaps, as barely to be recognizable.

In the meantime he sees running over his own road a heterogeneous conglomeration of foreign cars, many of which appear to have been worked and starved to death until they are literally tumbling to pieces, and by the time they reach the end of the road it will be well if he can get rid of of them without being compelled to renew one-half of their working traps. And so it goes on

day after day, to-morrow being but a repetition of to-day and the yesterdays.

To my mind, the worst feature in the whole system is that it costs at least fifty per cent. more to maintain foreign cars in this shiftless way, than it would to keep up one's own in first-class condition, chiefly due to the want of uniformity in those parts which more frequently need renewals. The subject of uniformity has been so often brought before the public, and such little heed paid to it by those whose province it was to have fostered and enforced its adoption, that, but for the necessity in showing the cause why the repairing of a foreign car should be more costly than that of a home car, I should have deemed an apology necessary for introducing at the present time, in reference to car matters, the word *uniformity*.

With respect to the remarks made by "Sutherland" on the "average master mechanic," I would like to say a very few words, not that I take exception to any of the arguments adduced, which I consider fairly and temperately stated, but that I wish to vindicate them with reference to the opening sentence, affirming that there is no class of men "so undeservedly overestimated as the railway master mechanics." I like to see an opponent just even if he be not generous, and affirm only that which he can squarely verify. Having a personal knowledge of a large number of the members of the Master Mechanics' Association, and, judging from what I have seen and heard at their annual meetings, I believe that, as a body, they rank very little behind their engineering brethren, although there is a wide distinction in their relative requirements. Civil engineering, in its fullest sense, requires its students to be possessed of a higher grade of mathematical education than is required by the mechanical engineer; but as a set-off for this, the latter, as a rule, is more of a practical man than the former, and understands from a working experience what the other, perhaps, has learnt only from books. I do not mean, however, to assert that practice in all things is better than, or even equal to, theory, but it is very certain that a practical knowledge of the working of a locomotive is, to a master mechanic, of greater service to him than all the theory he could learn if otherwise short of the practical part.

With the last part of "Sutherland's" letter, I am in accord to a dot, and re-echo the sentiments which he has therein so well expressed.

JOHN ORTTON,
Canada Southern Railway.

ST. THOMAS, Ont., October, 1881.

[The two letters referred to by our correspondent were written by different persons, entirely unknown to each other.—ED. CAR-BUILDER.]

The Nailing of Car Floors.

To the Editor of the National Car-Builder:

A few days ago, while some workmen were engaged in nailing floors on flat cars, one of them held up a 5-inch cut nail and exclaimed, "These are the very best nails that can be used for car flooring." As most of his fellow workmen were of a different opinion, he was asked to give his reasons. "Why," said he, "it is because they split the floor timbers from end to end; the more splitting the more repairing, and this makes business lively in the shops."

There is more truth than poetry in this. If the floor of a car that has been nailed with these monster nails is taken up, it will be found that the timbers are not only split, but that water and dirt have worked into the cracks, causing the frame to decay, so as to be condemned at least eighteen months sooner than if a more suitable nail had been used. And besides, these blunt-pointed, wedge-shaped nails are the very worst things to drive into hard pine. For my part, I cannot understand why such nails are preferred to the pointed wire nails, which are easy to drive, take a good hold, and, on account of their uniform thickness, do not split the wood. Aside from the necessity of more frequent repairs, involving increased cost and a waste of material, this is one of the little things that will lead to an earlier introduction of iron beams in car building. This is a feature of the case which should be considered by every

WOOD-WORKER.

False Valve Seats on Locomotive Cylinders.

The varied travel of a valve driven by the link motion makes frequent refacing necessary as compared with a valve motion embodying a constant travel of the valve. The original seat must in time be replaced by a false seat.

This is ordinarily done by getting out a cast seat as shown in Fig. 4, *a* being a pocket for the reception of a bolt screwing into the top of the cylinder in the exhaust cavity. Studs *b b b* are located, which, when in place, are riveted into countersunk recesses in the false seats. When this plan is adopted, the studs should be of brass, as wrought iron studs, from wear, stand above the surface,

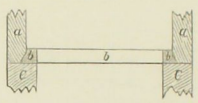


Fig. 1.

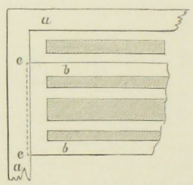


Fig. 2.

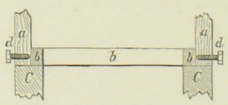


Fig. 3.

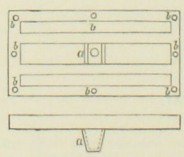


Fig. 4.

while the brass ones wear away evenly with the seat.

Fig. 1 shows a false seat *b*, held in place by being dove-tailed under the chest *a*, without studs. In Fig. 2, *e e* shows the projection of seat under the chest, by which means end or other motion of the seat is prevented. Fig. 3 shows another plan that is sometimes used. Holes through the chest *a* are drilled—about four on a side—and tapped for the set-screws *d*, and the screws forced in until they mark the sides of the false seat, which is then removed and countersinks made for the points of the screws. These countersinks are located about $\frac{1}{32}$ of an inch above the position indicated by the points of the set-screws, so that when the screws are finally forced into place the bearing of the points will be on the lower side of the countersinks, which will draw the seat to its place.

It is a frequent practice to scrape the seats to the cylinder, some shops taking them as they come from the planer, smearing the face of the cylinder and seat with acid, and depending on the resulting "rust joint."

The false seat invented by Mr. Watkeys, of the New York Central, is a splendid idea, and is very successfully applied. The rapid wear of link motion valve seats would indicate that engines should be built originally with false seats, as a proper design for holding the same can then be better applied, and renewals made similar to the way brasses in main and side rods are renewed.

FRANK C. SMITH, M. E.

The Link Valve Gear for Locomotives.

To the Editor of the National Car-Builder:

The *Railroad Gazette* of Oct. 7 contains a communication signed C. Berkley Powell, Draughtsman, in reply to an article of mine in your September issue on the defects of the link valve gear for locomotives. Although I would have preferred to hear from the master mechanic of the road with which Mr. Powell is connected, I will endeavor to correct some of the misapprehensions of the writer, which seem to have originated in the school house rather than in a practical familiarity with the mechanical department of a railroad.

He begins by saying that I have doubtless overlooked the fact that marine engines use the link motion to an almost universal extent. I fear, however, that he has lost sight of the fact that the link is used on such engines simply as a *reversing gear*, while an independent valve on the back of the main valve is used for cutting-off. As a reversing gear the link has no superior, and it was originally intended and used for that purpose only, until it was discovered that it could be utilized as a kind of poor apology for a cut-off. Its much lauded economy, therefore, is not due to the link, but to the identical device that I have upheld as being the best for economizing in locomotive practice.

Mr. Powell evidently thinks that air-cushions, springs, etc., are necessary adjuncts of automatic stationary engines; but the fact is that the modern automatics are as innocent of springs and air-cushions as is the locomotive. The explanation he submits, and which he says is so "easy," why railway managers are not displeased with the link, is rather gratuitous than otherwise, in view of the fact that they, as well as many of their master mechanics, have a very imperfect knowledge of it. It is frequently asserted that the excessive compression of the link gear is not injurious, as the power required to compress the steam is given back by the reaction of the compressed steam on the return stroke. This is not true, for the power to compress must be increased by the friction of the engine for that stroke, while the same friction must be overcome and must therefore be deducted from the effective reaction of the compressed steam before the reaction occurs. If compression, as given by the link on short points of cut-off is not injurious, it must be beneficial; and if the latter is true, why not carry the compression still further until the compression line approximates, so to speak, the expansion line? But as the horse-power of an engine is represented by the area of its dia-

gram, it is clear that the closer the expansion and compression lines are together, the less area and horse-power there is developed. But it may be said that the link, by early compression, saves some steam, that is, by detracting from its capacity to be used again. Would an engine builder be considered a wise or an unwise man who should attach a pump to his engine to pump back into a reservoir a portion of the exhaust steam, and retain at the same time a boiler pressure in the reservoir? When looked at in this light, the absurdity of the excessive link compression is manifest. Or, suppose a man should attach a pump to a water-wheel, to be driven by the wheel, for the purpose of elevating a portion of the water after it had performed its work in passing through the wheel, up into the reservoir again. Would this be considered good engineering, and is there any practical difference between this and the excessive compression of the link?

The whole matter hinges, however, on the cost of producing a horse-power. That eminent mechanical engineer, John W. Hill, in his report of the tests of a Baldwin locomotive, says:

"Taking the economy of the engine as represented by 30.02, 31.05 and 29.72 pounds of steam per indicated horse-power per hour, or an average of 30.26 pounds for the whole trial, etc."—and "A 16-inch non-condensing Harris Corliss engine working at 500 feet piston speed, initial pressure 100 pounds above atmosphere, and cutting off at two-tenths of stroke, would require about 21.5 pounds of water per indicated horse-power per hour"—and again, "The valve gear should be so devised as to produce full port opening for all cut-offs, and the area of port opening should be calculated for maximum piston speed. It is just as desirable that the initial pressure in the cylinders of a locomotive shall approximate boiler pressure as in the automatic cut-off engine, and this result also is attainable without complicating the valve gear or diminishing the efficiency of the engine."

In a test of engine 180, on the Wabash road, by Jacob Johann, master mechanic, he gives the amount of water evaporated per hour per indicated horse-power, as 31.4 and 29.1 pounds, the same service being performed by any good automatic stationary engine on 22 pounds. It is true, however, that at very short points of cut-off the link is economical, but the economy is purchased at the expense of the capacity of the engine to develop power.

I have, I believe, shown clearly that the link is defective, because for equal admissions it falls far short of an ordinary automatic in the power developed (See indicator cards in September CAR-BUILDER), as well as the greater consumption of water per horse-power per hour.

The writer was some years ago connected with a road, which, in consequence of the reputed efficiency and simplicity of the link, changed some of its independent cut-off engines to link gear, and in each engine it was necessary to reduce the exhaust nozzles, thus indicating a greater demand for steam. With the independent cut-offs, however, the valves would remain tight for five or six years without removing the chest covers or seeing or touching the valves, while with the link fitting, the seats had to be looked after every six to nine months.

An officer high up in the Master Mechanics' Association says: "No advantage would accrue in holding on to the steam to the end of the stroke, etc." Why not? With the link, a smaller exhaust nozzle is necessary, because the link fails to obtain the greatest amount of work out of a given quantity of steam, owing to wire-drawing, early exhaust, compression, etc.; therefore, as compared with a proper valve gear, more steam is necessary with the link; and to produce this extra quantity requires a sharper blast, the extra blast requires smaller nozzles, and these an earlier exhaust to give more time for the escape; therefore, the argument of the officer referred to amounts to the assertion that one evil cannot exist unless another dependent one exist also, and hence the first evil is necessary.

FRANK C. SMITH, M. E.

Rolling Stock and Permanent Way.

To the Editor of the National Car-Builder:

In reducing railway practice to a science it has been found necessary to establish proper relations between permanent way and rolling stock. It has been found unwise to build a cheap road-bed, surmount it with a superstructure of light material and equip it with heavy rolling stock with a view to heavy traffic. Just now there seems to be a growing disposition to double the carrying capacity of freight cars. It has been said by some of the philosophers that whoever causes two blades of grass to grow where only one blade grew before, is a public benefactor. This, when taken in its right sense, is true, and the same aphorism may be applied to whoever shall introduce cars that will safely carry 30-ton loads. Safety is the essential thing, and means not only the proper construction of the cars, but also the safe condition of tracks and bridges. There should be no difficulty in building cars strong enough to carry any desired load, but whether it would be expedient to do so to an unlimited extent is an open question, unless the tracks and bridges are in a condition to stand the additional strain.

In the earlier days of railroading in this country we had light road beds, ties placed far apart and also light rails; and ten tons per car was intended to be the maximum load—the weight of locomotives varying from 26 to 30 tons each. This was, of course, entirely out of proportion to the permanent way, and the general complaint was that the locomotives were destroying the track. There has, nevertheless, been a steady increase in the size and weight of engines, but in most instances the tracks have been improved in advance of such increase, and consequently have not suffered as much from the growing weight as they otherwise would have done. The advantages that will result from the adoption of cars of 20 tons capacity are many, yet it can not be denied that there are some obvious disadvantages. Chief among these is the liability of trains made up of such cars to find weak places in bridges. There are frequent bridge failures with comparatively light trains, and unless bridges are specially adapted to the increased loads, say 10 tons more freight per car, and stronger and heavier cars to carry it, more frequent failures of bridges may be expected in future. A bridge may sustain a 50-ton locomotive with an ordinary freight train without yielding to any perceptible degree, while the same locomotive with a train of cars loaded with 20 tons each (or 30 tons, as some of the more progressive car-builders are predicting) would destroy a bridge of the same structure and capacity.

The first thing that should be done before bringing 20 or 30-ton cars into use is to put all bridges and trestles into a condition to carry the heaviest trains without a possibility of failure from a mere excess of superincumbent weight. Apart from bridges and trestles our roads are, as a rule, in a condition to carry any reasonable increase of load that may be desired. With good road-bed, good ballast and plenty of it, an abundance of crossties supporting heavy steel rails properly spliced a 40-ton locomotive makes but little impression on the track, and there does not seem to be any good reason why cars may not be loaded up to something near the weight of a locomotive, without injury to permanent way. It does not seem to be the right thing to use enormously heavy locomotives to haul light trains, or, rather, light cars. Such engines cause great disturbance of light permanent way, while the cars, have scarcely any effect upon it, and it seems as if the destructive effect might be more equally divided between motive power and train.

In the days of light rails and rough tracks when the maximum car load was 10 tons, cars were frequently found to be loaded with 15 tons. At a later period cars with a marked capacity of 16 tons were in some cases found to have a load of 25 tons, and in one instance 32 tons. A New England dump-car on the Boston & Albany road, weighing 19,300 lbs., carried 62,000 lbs. of gravel. This is 321 lbs. of load to 100 lbs. of car. An 8-wheel coal car on the Penn. & N. Y. road, weighing 20,476 lbs., carried a load of 60,144 lbs., or 293 lbs. to 100 lbs of car. When it is known that cars rated at 10 tons have habitually been loaded to nearly twice that weight with no serious results, it is tolerably clear that cars built to carry 20 or even 30 tons would be perfectly safe under these loads. A short train can be more conveniently handled than a long one. It takes up less room on sidings and in yards, which is a matter of considerable importance, to say nothing of less yard work and less trouble at warehouses. With cars of 20 or 30 tons capacity it would be impossible to overload them, as is the custom with 10-ton cars. Great losses have been sustained by railway companies by the overloading of cars, and a great saving may be made by using cars of increased capacity and weighing the freight. Carrying freight by the car-load and allowing shippers to overload, as they invariably do unless they are closely watched, is a losing business.

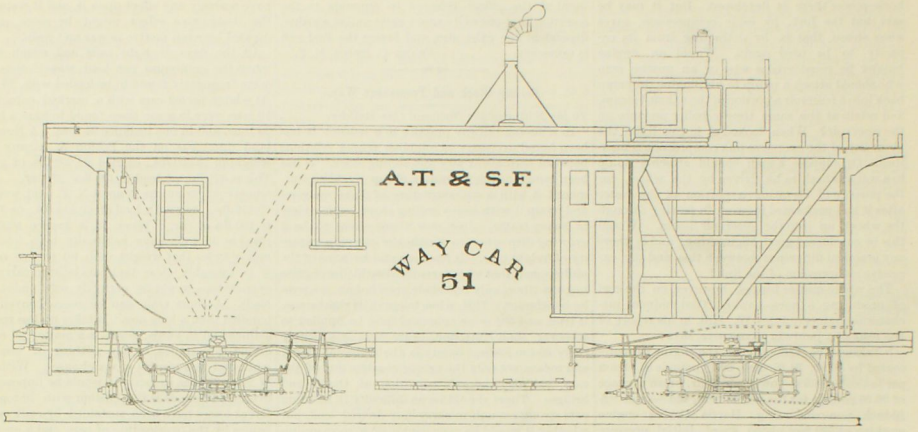
It would cost much less to equip a road with 20-ton than with 10-ton cars. This would be a saving in first cost, and there would also be a great saving in repairs. If 50 cars can be made to do the work of 100, there would be a saving in the wear and tear of 50 cars in addition to the natural deterioration of the wood-work, and also a saving of oil and fuel. All things considered, there seems to be no good reason why the coming freight car should not carry 30 tons.

WM. S. HUNTINGTON.

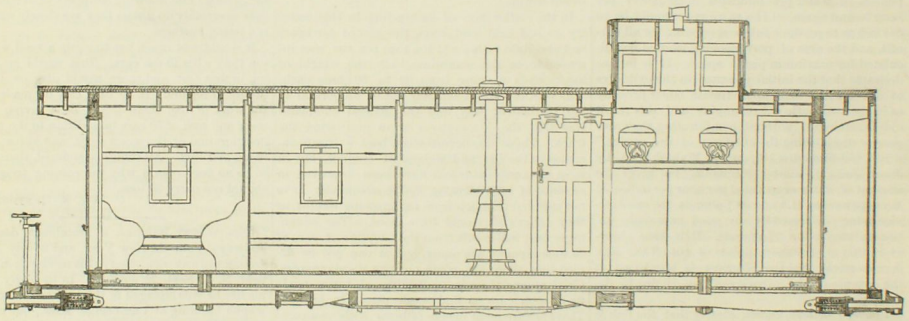
MR. ALBERT BRIDGES, a prominent dealer in railway supplies in New York, and widely known among railway men, died at his residence in Westfield, N. J., Sept. 22, aged 70. In the early part of his life he was engaged in the business of car and wagon building at Cambridge, Mass., but came to New York in 1851 and opened a general railway supply store, in which business he continued until his death. He was a good practical mechanic, and devised many improvements in railway appliances.

THE Green Bay, Winona & St. Paul road has just finished a brick blacksmith shop, 40×60 ft., in addition to their general shops at Green Bay, Wis. Mr. Osborne, the Master Mechanic, makes his smoke-stacks after a plan similar to that described in the September CAR-BUILDER. Instead of angle-iron, he uses a piece of one-inch round iron in which a groove is planed out for the edges of the smoke-stack sheets, and instead of a link over the cars at the end a bolt is used. Instead of netting, he uses castings with 1½-in. slots. These castings cost less than netting at first, and wear much longer. As the slots widen upward, they never clog, and they never break out. The road has 30 locomotives, including five ten-wheel and three moguls. The latter are preferred on account of the grades, which are over 100 feet to the mile. Two more moguls are being built, with cylinders 18×24, drivers 54 in., and weighing 50 tons in working order. The road is also getting three switching engines with six drivers, independent tanks, and no trucks. Two of them will have 17×24 cylinders, and the other 14×22.

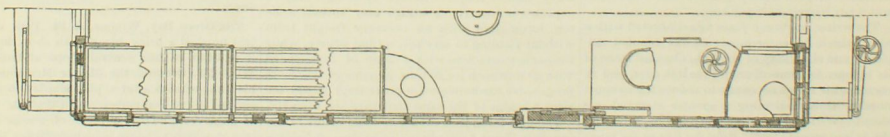
STANDARD WAY CAR—ATCHISON, TOPEKA & SANTA FE RAILROAD.



Side Elevation.



Longitudinal Section.



Half Section 5 ft. from Floor.

GENERAL DIMENSIONS.

Length of body over end sills	30 ft. 0 in.
Width of body over side sills	9 " 1½ "
Height from under sill to top of plate	7 " 6 "

BODY TIMBERS.

Outside sills, nr. or yel. pine,	4½	x	7¾	in. x	29 ft. 3	in.
Intermediate sills, " "	4½	x	7¾	" x	29 " 3	"
End sills,	wh. oak, 5¾	x	7¾	" x	9 " 1½	"
Needle beams, " "	7	x	4	" x	9 " 1½	"
Draft timbers, " "	4	x	9	" x	13 " 4½	"
Platform timbers, " "	4	x	5½	" x	13 " 4½	"
Corner posts,	ash, 4	x	4	" x	7 " 3	"
Side door posts, "	4	x	4¾	" x	6 " 7½	"
End door posts, "	4	x	4¾	" x	6 " 7½	"
Intermediate posts "	2¾	x	3	" x	6 " 7½	"
Side braces, "	1¾	x	5½	" x	8 " 3	"
End braces, "	1¾	x	5½	" x	8 " 3	"
Side girths, "	3	x	1¾	" x	29 " 8	"
End girths, "	3	x	1¾	" x	8 " 9½	"
Side plates, pine	3	x	5¾	" x	30 " 0	"
End plates, ash	3	x	12	" x	8 "10½	"
Carlines "	2¾	x	1¾	" x	9 " 7½	"
End door sills, ash	1¾	x	6½	" x	3 " 3	"
Side door sills, "	1¾	x	5	" x	3 " 6	"
Side doors, "	2 ft. 7½			" x	6 " 2	"
End doors, "	2 " 4			" x	6 " 1⅝	"

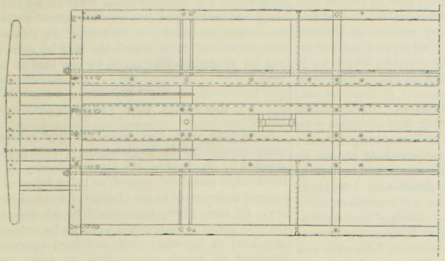
CONSTRUCTION.

End sills secured to longitudinal sills by ⅝ x 13 in. joint bolts, the latter sills having double tenons at each end. Nuts to be let in 5½ in. from the shoulders of side sills.

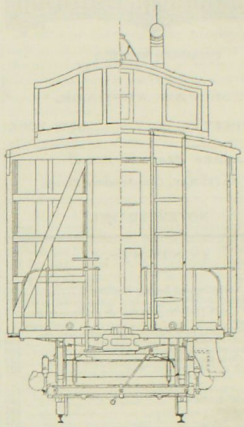
Transoms made of 2 wrought-iron plates, ⅜ x 6 in., the upper one to have a lip on each end, ⅞ x 1¼ in., welded on.

Draw-bars, standard Potter pattern.

Truss-rods, 1¼ in. and 30 ft. 8 in. long, passing



Floor Frame.



End Elevation and Section.

through end sills, 2 in., from outside of intermediates, with cast-iron washers at each end.

Brake beams (4 to each car) to be hung with 26 × ⅜ in. hangers, and 20½ × ⅜ in. safety straps.

Brake staff at each end of car, and connecting with equalizer at each end by rod and chain, 11 ft. 4 in. × ⅝ in.

Tool box underneath car, 7 ft. 10 in. long by 6 ft. 10 in. wide, and 2 ft. 6 in. deep.

There are 7 vertical ⅝ tie-rods on each side, four ⅝ vertical rods at each end, and one ⅝ cross rod at each end, connecting side plates.

There will be 3 horizontal ribs and 4 braces on each side of car, and 2 braces on each end, the ribs to be halved into each intermediate door and corner post, and braces into ribs and posts.

Carlines to be smoothed and corners chamfered, and the ends dove-tailed.

Roof to be of ⅞ × 5½ in. pine boards, matched and double-beaded, smoothed on under side for painting, and covered with tin. Running-board of pine 2 × 12 in.

Cupola roof covered with ⅞ × 5½ in. matched and double-beaded white pine, with covering of tin, and standard red light lamps in center.

There will be one ladder at each end of car; also 4 bunks 6 ft. × 2 ft. 8½ in., and 2 sliding settees of same dimensions, to each car; the bunks to be swung up and fastened to roof. Also, 4 end seats, 2 platform seats, one long seat, and one revolving arm chair.

Saloon, clothes closet and platform stands to be made of ⅞ × 5½ in. matched and double-beaded clear white pine.

Flooring to be of Norway or yellow pine 6 to 8 in. wide, 1¼ in. thick, with halved joints. Lining to be of ⅞ × 5½ in. pine.

Each car to have three outside coats of paint, three coats of wearing body varnish, lettered with Tuscan red and drab shade; battens, striped dark gray; deck, two coats lead and one of engine vermilion, varnished as above; roof, two coats Asbestos paint; platforms and steps, two coats mineral paint in oil; outside iron work, except trucks, one coat of black and two of varnish; trucks, one coat of oil and lampblack.

Sides of cars, bunks, partitions and deck, two good coats of buff. Ceiling, two coats of pea green. Finish for partitions, bunk frames, and door casings, two coats shellac. Raised platforms and wash closet, two coats drab. All inside iron work, blacked. All work inside finished with one heavy coat inside car varnish. Deck lettered "For train men only." All glass beaded and of double strength.

Each berth to have one mattress 36 in. wide by 72 in. long, the top to be covered with brown terry, the bottom with ticking, and filled with moss, well sewed and tufted. Each settee will have double cushions, sewed together at the edge, forming a hinge, making seat and back when in position, and mattress when drawn out. Size of cushions will be 19 in. wide by 72 in long, and 15 in. wide by 72 in. long. The top covered with Brussels carpet, the bottom with Montana cloth, and filled with tow and curled hair. Proportion of hair one-third. Each seat to have cushions made in the same manner as settees, covered and filled with the same material. Size 15 in. wide by 34 in. long, and 19 in. wide by 34 in. long. Platform chair to have cushion made of enameled duck, and filed with curled hair. Each platform seat to be covered with Brussels carpet and stuffed with tow and hair. One side lounge covered same as platform seats.

Trucks of Thielsen pattern, with Hewitt box lids, and elliptic springs.

English Car-Body Framing.

MR. FORNEY, in a letter to the *Railroad Gazette*, remarks as follows in reference to the framing of English railway carriages at the Ashbury Carriage Works, at Manchester:

"The system of framing car-bodies in England is essentially different from the practice in America. Here the body itself is entirely separate from the under-frame, as it is called, or what Americans call the sills or floor frame. In American cars the body posts are mortised into the side sills, and the upper portion of the body and the sills are thus all framed together and form one structure. The fact that we have no side doors enables us to truss or brace the side below the window sills with diagonal members, so that the sides form a girder with a depth equal to the height of the window sills above the bottom of the side sills. The side doors of English carriages, however, make the side bracing impossible, and therefore they must depend upon the under-frame for strength. As the body of the four-wheeled English carriage is only about 30 ft. long, it is not difficult to get strength enough in this way, and although those with six wheels are longer they are supported under the middle, so that they too can be made strong enough. The body itself, as stated above, is framed separately from the under-frame, and is bolted to the latter with india-rubber blocks between them. While this system is very well suited for the small four and six-wheeled "carriages," the conditions are very different for a "bogie" car 54 ft. long, which is supported only on the centers of the bogies or trucks. It is then very difficult to get strength or stiffness enough if we must depend upon the under-frame alone for it. In the construction of the cars which we are describing, the bodies are framed English fashion—that is, separate from the under-frames, and the latter are strengthened by reinforcing the sills with wrought-iron plates on the outside and making them deeper in the middle than at the ends. Cars with side doors on the old Camden & Amboy Railroad, which were built thirty or forty years ago, were made in this way. It is not a neat form of construction nor a strong one. It is proper to say, though, that the Ashbury Carriage Company is only carrying out the designs furnished it."

"The finish of these cars is, however, very neat, and if one of them could only be submitted to the observation of every superintendent and car-builder in the United States, they would, we think, be profited by the study. There is an absence, as there is in all English "railway carriages," of the tawdry decoration which is only too common with us."

THE English language on the tongue of a man who wishes to express a strong feeling or conviction has vast capabilities. When that animated corkscrew commonly called a reporter, asked Mr. Field the other day what his opinion was of the certificates which the Manhattan Company desires to issue in payment of their debts, the man of finance replied that he wouldn't give a dollar for as many of them "as a jackass could draw down hill." What a limitless sense of worthlessness the words convey. They are as expressive as the language of the farmer in old colonial times who said that he would sell wood for the paper currency then extant, but it must be "cord for cord." If Mr. Field had declared that he wouldn't give a dollar for as many certificates as a jackass could draw up hill he would have given one a far-off suggestion, a vague and indefinite sense of infinitesimal value; but alas! for the worth of paper when as much of it as will roll down hill of itself and push a donkey in front of it is not worth a dollar.—*Engineering News.*

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EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of the month.*

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STANDARDS IN CAR CONSTRUCTION.

For years past much has been said about the necessity of established standards in the construction of railway cars, but more especially in reference to the different classes of freight cars—not merely local standards for particular lines of road and their immediate through connections, but a general standard for each of the more numerous classes of cars. Such standards, so far as they may be adopted and adhered to, imply uniformity, and all the economical advantages resulting therefrom in the interchange of an enormous and ever increasing traffic. The necessity of a uniform track gauge is questioned by no one, and there would seem to be almost as great a necessity that all the essential parts of the running gear of freight cars should be practically interchangeable. The subject has been discussed at every meeting of the Car-Builders' Association, but with no very marked results except to develop the obstacles which lie in the way of the practical realization of what is so much desired. These obstacles, it must be confessed, are sufficiently formidable. Local standards are constantly increasing, but they are liable to be superseded sooner or later by something different and perhaps better. A real standard should be general and not local, permanent and not transient, or the term loses its significance. So far as peculiarities of construction are concerned, there should be no such thing as "foreign" cars on continuous lines of traffic—that is, cars that have to be studied as a curiosity when they break down or need repairing. They should approach as near to uniformity in their trucks and drawing attachments as if they were owned by one road and built at one shop.

In the face of all this, it is safe to predict that the only standards that are likely to prevail for many years to come will be local, diverse and variable, and these will be equivalent to none at all. The reasons for this are sufficiently obvious. Rigid standards for the same classes of cars, if rigidly adhered to by all the leading roads, would put a stop to all improvements that interfered with what was already assumed to be perfect. The roads are not quite ready for this, and prefer to leave the door open for new devices a while longer. In the German railroad system there is, we believe, a code of technical regulations in relation to the dimensions of cars, size of wheels, axles, etc., that has the force of law, and is obligatory on the companies. But in order that such regulations may not be a rigid bar to improvements they are subject to periodical revision, the object being to secure substantial uniformity for a time at least; and whenever any changes are made they shall be of the same kind and adopted at the same time. But in our voluntary system each road is a law unto itself, and the same may be said of very many car-builders to the extent of their influence. They are by no means indifferent to the advantages of uniformity, but they want the advantages without the uniformity, because uniformity necessitates conformity to some prescribed standard which subjects them to a kind of self-imposed restraint more or less irksome and unprogressive. And then there is a kind of natural aversion on the part of many railroad men to making use of any particular pattern or device that happens to be used or approved by other roads than their own.

When our so-called railroad system shall become sufficiently systematized to secure the requisite co-operation in this matter, we may look for some recognized standards that will be adhered to simply because diversity will not pay. The tendency seems to be in the right direction. The first steps must be taken by some of the great lines, and the accruing advantages will speedily be felt by their immediate connections, until eventually it will be discovered that what is good for one system of lines is good for all. Indeed, the urgency of the case was considered so great, a year and a half ago, that a concerted effort was made by the managers of the so-called Vanderbilt roads to establish standards for the different classes of freight cars on their respective lines. The effort, we believe, was successful; sample cars of each class were built, inspected and approved, together with the detailed specifications for their construction. This, at least, is our impression, although we have never seen the specifications or drawings. If there has been any failure in the practical working of the plan, we have not seen any announcement of it, and therefore we conclude that the establishment of a local standard, embracing a system of roads with such a heavy combined traffic and important connections, will be an example worthy of imitation. In this way the number of local standards may be reduced, and an approximation made to one that is universal.

RAILROADS AND ESTHETICS.

Some fifty years ago, when the first railroads were constructed in England, they were fiercely assailed by Mr. Ruskin, the great authority in esthetic taste and development, as being inimical to art and destructive to the charms of natural scenery. Of their utility there could be no question. On this account they would have to be tolerated as a kind of necessary evil, and their operations confined as much as possible to noisy manufacturing districts and the most barren and unpicturesque regions of intervening country. Any thing like decoration in connection with a railway or any of its belongings was regarded by Mr. Ruskin as not a whit less absurd than it would be to decorate a smith's anvil with filigree work, or the handle of a sledge with mosaic inlay. The only business railways were expected to do was to carry freight and passengers as quickly and as safely as possible to their destination. The attempt to blend art with utility, the contemplation of the beautiful with the clang of wheels and engines, was a profanation of art degrading to all the finer instincts of human nature. The locomotive was merely a kettle on wheels, and a railway station the abode of discomfort.

In the first stages of railway progress, this was all very natural to a mind peculiarly sensitive to the charms of ancient and medieval art. The discovery of the uses of steam and its application to purposes of transportation was an irruption into the old order of things, as fierce and as resistless as that of the barbarians into imperial Rome. The new agent had none of the charms of antiquity and hoary tradition. The construction and equipment of a line of railway, even in favorable localities, involved great hazards and a vast outlay of capital. Nothing but the practical side of the undertaking could be thought of, and consequently the sentimental and esthetic elements were excluded. But with the mechanical perfection of the system comes the reaction, somewhat as the refinements of the Roman civilization were revived among the hordes that assailed it. The old becomes incorporated into the new, and our railroads, instead of being the incarnation of avarice and money-grubbing and nothing else, are doing much to adorn and beautify every visible feature of their construction by the expenditure of large sums over and above what is required for mere purposes of utility. It is said that some of the station agents on some of the New England roads are allowed an annual sum for the purchase of flower-seeds, plants and shrubs, and that prizes are awarded to the agent who makes his station the most attractive. Even the dreary ruggedness of the road-beds is slowly giving place to something suggestive of grace and symmetry, and in keeping with the increasing embellishment of bridges, stations and other structures.

Of passenger cars we need not speak. The resources of the artisan and artist are taxed to the utmost in their decoration. It is only a few years since any attention has been given to the construction of station houses, so as to make them more attractive. There were in fact no existing models, either ancient or modern, for this class of structures. At first they were regarded as a mere tem-

porary shelter for people who only visited them on compulsion. But now they exhibit almost every variety of form and combination of material that the engineer and architect can devise. Some of the great terminal stations in this country and in Europe are massive and imposing structures and models of graceful design, and the same may be said of bridges and viaducts. The locomotive, were it not for the dress it wears, would not be a beautiful object. A blooded race horse would attract far more attention; but the burnished trappings are superadded to the engine to hide its ugliness and keep up appearances. In a word, it must be made to look beautiful to gratify popular taste, and this accounts for the failure of the movement made a few years ago to abolish the practice of "shining 'em up."

It must be admitted that, as far as possible, a railroad must be straight and level, which is incompatible with Hogarth's line of beauty, or the picturesque curves and undulations of a country road. But the Pennsylvania Railroad Company is doing much to compensate for these defects, by beautifying the margins of its tracks with sodded embankments, wire fencing and the planting of trees and shrubbery; and the time is likely to come when our railway lines will be bordered with handsome hedges, as many of the English lines are. The practice of ornamenting the grounds around way stations with grass plats, flower beds and other features of landscape gardening is becoming more general every year, and this, with station houses of more elegant design and construction, will go far to banish the unsightliness of the older and more primitive structures. Many of the existing ones, including some of recent construction, have a kind of forbidding aspect, caused by the use of heavy material and small windows. It seems to us that iron and glass as materials might be used to a greater extent in these buildings, making them more airy, elegant and graceful in appearance, if not more durable and convenient. Iron can be cast and wrought into an infinite variety of beautiful forms, and with the aid of color these forms can be made highly ornamental and effective, especially in the framework of platform roofs and their supporting pillars. Glass can also be used to great advantage as sky-lights and also for roofs.

But it is not our purpose to suggest improvements when they are being so rapidly developed; but rather to show that railroads are not necessarily antagonistic to the enjoyment of art, or destructive to our sense of the beautiful, that they do not ruthlessly disfigure and mutilate the fair face of nature and turn us all into Mammon worshippers and stock speculators.

PRIZE CATTLE CARS.

At the annual meeting of the American Humane Association, in Boston, Oct. 19, President Brown stated that no one of the 700 designs for cattle cars that have been presented had sufficiently complied with the specified requirements to entitle the inventor to the $5,000 prize offered by the association.

This result might have been predicted at the outset with tolerable certainty, even if the prize had been ten times the amount, with a liberal allowance for the patent. The conclusion would seem to be either that the numerous competitors were incompetent to produce the kind of car that is wanted, or that the requirements were such as to baffle inventive ingenuity. A target may be placed so far off as to be beyond the reach of the most scientific gunnery. All attempts to hit it are not only a waste of ammunition but a grievous disppointment to the shooters. This is about the upshot of the famous cattle car tournament. Nobody has won, simply because the standard of excellence set up was practically unattainable. The offered prize is to be entirely withheld. No part of it even is to be divided among the more meritorious of the competitors. This, in connection with the fact that the judges selected to make the award comprise some of the most capable and experienced railroad men in the country, would seem to imply that among the 700 designs there is no single one that exhibits any marked or striking improvement upon the best cars of this class now in service.

Considering the inducements offered, as set forth in a circular issued by the judges more than a year ago, there was nothing to justify buoyant expectation. But inventors as a class are naturally sanguine. The offer of the Humane Association was prompted by a desire to secure better treatment for live-stock during transportation. This was the primary consideration, and the vaunted prize was practically conditioned upon a car so constructed as to enable the cattle to ride with comparative comfort without increasing the cost of their transportation or the cost of cars, and at the same time to be adapted to the carriage of other live-stock, and also of merchandise. These, it must be admitted, were pretty hard conditions, in view of the indifferent success of the previous efforts of inventors to meet them. Two blades of grass can be made to grow where only one grew before, provided there is room enough and the soil is congenial; but to carry two Texas steers within a space where only one was carried before, and to provide room at the same time for the two to lie down and rest, where there was barely room for the one steer to stand up, is a more difficult matter. All that is necessary to enable cattle to ride comfortably is to provide the requisite space. In this respect animals are not different from human beings. It is a mere question of floor space. If the existing relations between a given area of such space and the space occupied by a certain number of animals now held to constitute a car load, can be changed so as to better accommodate the animals, it would have been done before this. But it can't be done. The transportation of live-stock is a matter of business and competition. No mere humane considerations, or humane society prizes, are likely to prevail upon roads or shippers to pack cattle loosely into cars merely to promote their physical comfort, while rival roads and shippers are doing precisely the other thing from purely mercenary considerations. The tendency in freight transportation is to carry a greater proportion of paying weight, and it is not an easy thing to make live-stock freight an exception.

We had really hoped that this worthy effort of the American Humane Association to mitigate the miseries of cattle during transit would have been followed by more satisfactory results, but have never been able to see any very good grounds for such a hope. The association assumed without sufficient knowledge that a car could be designed to meet certain requirements that in the nature of things could not be complied with, and that it would be forthcoming when a sufficient money inducement was offered. In this the association was mistaken.

CAR VENTILATION.

This subject has been so belabored during the past ten years that it would seem next to impossible to originate any really new device that will be more practical and effective than some of those already in use, or that have been suggested. It may be, however, that there is still "room at the top" for inventors of the persevering sort who are ambitious of reaching a final solution of the problem. The trouble is that most of the more recent methods that have been proposed are but modifications more or less of previous ones. The number of devices is increased, but with no very obvious difference as to their intrinsic merits. Some of them seem to have reference mainly to summer ventilation, or keeping dust and cinders out of cars without obstructing the necessary supply of outside air, and making no adequate provision for the more important matter of winter ventilation, complicated as it is with heating, and the accumulated impurities shut in when doors and windows are kept closed.

A new apparatus of this class—the invention of Mr. Andrew J. Chase, of Boston—has recently been tested on the Boston & Albany road, and is said to have worked well. It is described as follows:

"There are two general principles involved in it: One, the supply of fresh air, freed from dust, cinders, etc.; the other, the expulsion of the foul air generated by the lungs and bodies of the occupants of the car. The air, as the train passes rapidly onward, is caught by a kind of scoop or mouth, and is forced, cinders and all, downward through a pipe into a reservoir, where it strikes the water contained therein with sufficient force to be driven through it. After being thus cleansed and cooled, the air is forced, by the pressure of the descending column, upward through another pipe or funnel, and discharged into the body of the car. This air, being pure and cool, naturally gravitates to the bottom of the car, displacing the warmer vitiated air, which then ascends to the top of the car, where it is got rid of by an ingenious device. This consists of two long pipes or tunnels laid upon the outside of the car, on each side of the monitor top. These tunnels are jacketed at both ends by a larger pipe, having a kind of bell-mouth, to better gather in the air. Through these outer bell-mouth tubes —that is, the rear ones—the external air rushes with a velocity proportioned to the momentum of the car, and, by its rapid movement, serves to siphon or pump the vitiated air out of the car, the tunnel used being connected with the interior of the car by small siphon pipes through which foul air is thus withdrawn. There are valves at both ends of the tunnels, which act automatically, the ones in front being closed by the pressure of the atmosphere when the car is put in motion, while the rear ones are opened by the same pressure being exerted through the bell-mouthed jackets."

A plan somewhat resembling this was tried many years ago on some of the Western roads. The inflowing air was cooled, and the dust and cinders deposited by contact with water carried in a reservoir underneath the car and holding two or three barrels. The impurities precipitated in this way made the water as black as ink after being used a few days. The apparatus was objectionable, however, on account of the weight, the room occupied by the reservoir, and the excess of moisture introduced into the cars in wet weather. The size and location of the reservoir in Mr. Chase's plan are not indicated in the above description. They may be such as to obviate the objections referred to. But there is another, and as it seems to us, a more important objection to the practical working of such a plan, even in summer, and that is that its whole purpose is defeated unless the doors and windows of the cars are kept closed so that no considerable quantity of air, mingled with dust, cinders and smoke, can obtain access except through the purifying medium of the water. Railway passengers, as a rule, have a decided objection to closed windows in hot weather. The great majority prefer to have the windows open and endure the annoyance of dust, smoke and cinders rather than be shut in and smothered in pure air. It is possible, however, that such people might be educated to the change contemplated by the apparatus, by sacrificing an imaginary comfort to a real one, but the process will in the nature of things be gradual.

We are inclined to think that the only substantial relief for these particular annoyances incident to summer travel, will be afforded by better ballasted tracks, in connection with more effective

spark-arresters and smoke-consuming devices. But until the primary causes are removed, artificial devices must be resorted to, and these will be adopted just to the extent that they are approved by the traveling public, without involving too much expense to the railway companies.

TRANSPORTATION OF PASSENGERS' BAGGAGE.

MR. MARSHALL M. KIRKMAN, in a forthcoming work entitled "The Baggage, Parcel and Mail Traffic of Railroads," advocates a radical change in the present system of transporting personal baggage on railroads, so as to make it fair and equitable to all concerned. He points out the cumbrous and unsatisfactory nature of the service as now conducted, and recommends that the business be carried on under a separate organization, and with a view to its earning capacity and the convenience of those who travel with trunks or parcels that are heavier than hand-baggage—the rates to be equitably adjusted so that passengers with light baggage, or none at all, will not be compelled to bear burdens that do not belong to them. He says:

"The carriage of the passenger and the transportation of his personal baggage belong properly to two different departments of railway service, and the customs that have grown up, founded upon a different theory, are wrong, and in almost every regard inharmonious in their effect. The accommodation afforded the passenger by the carriage of his baggage upon the same train by which he travels is, no doubt, very great; but this fact does not warrant a railway company in retarding the progress of those who have no baggage in order to enable it to accomplish this desirable object. The minimum number of articles necessary to the cleanliness and comfort of the passenger should be carried upon the train by which he travels. The weight and bulk of these articles are small, and they may in the majority of cases be deposited by the passenger under his seat or in the rack overhead. This is the equitable course. To compel a railway company to carry upon its passenger trains an amount of property, more or less, which the owner presents for shipment under the general head of baggage, without reference to the convenience of the railway company, or the accommodation of those who have no baggage, or only a reasonable amount thereof, is unjust as well as absurd. The relation that the presence of one bears to the comfort of the other is too distant to warrant the enforcement of so arbitrary a rule. As soon might we insist that the keeper of a restaurant should provide his customers with tooth powder or clean linen, under threat of fine and imprisonment if he failed. The relation that these articles would bear to the wants of the average number of his customers would be quite as reasonable as the average demand upon our railroads for excessive baggage accommodations."

The inequalities of the existing system are sufficiently glaring. Every pound of weight added to a railway train increases the cost of hauling. A pound of baggage can no more be hauled for nothing than a pound of merchandise regularly shipped and billed at current rates of freight. Why, then, should not the owner of it pay for its transportation in addition to his own personal fare? Or, if he is not required to pay, why should not a passenger going the same distance on the same train, but with no baggage, be carried for a proportionately less fare? This seems to embody the principle upon which any system of reform should be based. Of course it will not do to apply the principle, as it logically might be applied, to anything further than baggage. Inequality in the weights of passengers themselves must be endured, or else a person weighing 150 pounds, and having 100 pounds of baggage, might claim a fair offset against another person weighing 250 pounds, with no baggage.

MR. T. A. BISSELL, late Manager of the Pullman Car Works, in Detroit, has resigned that position, and has purchased an interest in the Barney & Smith Mfg. Co., of which he is to be Superintendent.

The "Eastlake Style" of Architecture.

This modern idea of architecture is of comparatively recent origin, being the outgrowth of conceptions originating with Mr. Charles E. Eastlake of England—not as a style of house architecture, but in connection with house furniture and internal decorations, as contained in a published work by Mr. Eastlake, entitled "Hints on Household Tastes." Its peculiar features, however, soon became popular, not only in the sphere of the mechanical arts to which it was first applied, but in the external embellishment of buildings. This popularity, to a greater or less extent, has spread throughout all sections of the United States, and is now being greatly sought after upon the Pacific coast.

Unfortunately, it is simply a "style"—not a classified "order" of architecture, with defined principles of treatment, and rules of application and delineation. It is so unrestrained in its requirements, that the wildest conceits of the uneducated pretender may be imposed, and the most absurd and distorted features defended as "in keeping with the style." Delineated with accurate taste and good judgment, its application in the construction of a certain class of buildings may be made pleasing to the eye; but the excessive *gaucherie* indulged in by a class of reckless adventurers, who abuse the integrity of this new idea by extravagant, unsightly and ill-conceived creations of their own, is calculated to render it offensive and repulsive to those enjoying a fair degree of refinement in the æsthetics of architecture; this may cause its rejection even as a "style," except by a limited number who prefer oddities and peculiar things because they are such.

Could Charles E. Eastlake behold some of the extravagant delineations covered by his name, he would doubtless cry to the gods to blot out the monstrosities as hideous deformities. Judicious liberties and combinations are excusable in all orders and styles of architecture; but when they run rampant, with no regard to consistency, beauty or harmony, the doctrine and rules of propriety cease, and disorder and distraction ensue. The tendency of the "new style" runs in this direction, as it provides the basis upon which unqualified men may operate, and find a defense for their stupid creations.

"All can't invent and imitate,
No more than those who clothe us can create."

And so it runs with the Eastlake style. Those who can invent nothing meritorious in architecture can imitate the new idea; that is to say, they can scribble up something that *looks peculiar*, and give it the name of Eastlake.—*California Architect.*

THE first Car-Builder's Monthly Meeting for the season will be held at the Association rooms, 133 Liberty street, New York, on Thursday evening, November 17.

THE new car axle works of Willard Sons & Bell Co., South Chicago, are complete, and new machinery, including a 2400 pound helve hammer, is being placed as fast as it arrives.

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Atchison, Topeka & Santa Fe.—Mr. M. C. Wheeler has been appointed Division Master Mechanic at Wallace, N. M. He was recently Master Mechanic of the Central Iowa road.

Atlantic & Pacific.—Mr. Geo. Chalender has been appointed Superintendent of Motive Power and Machinery, in place of G. B. Simonds, resigned.

Chicago, Burlington & Quincy.—Mr. D. T. Bacon has been appointed Superintendent of the Middle Iowa Division, with office at Ottumwa, Ia. He was recently on the Pittsburgh, Cincinnati & St. Louis road.

East Tennessee, Virginia & Georgia.—Mr. R. 'B Pegram, Jr., is appointed Superintendent of the Memphis Division. He was recently a division superintendent on the International & Great Northern.

East St. Louis & Carondelet.—Mr. Joseph Hill has been appointed Superintendent. He is also Superintendent of the Vandalia line.

Geneva, Ithaca & Sayre.—Mr. John S. Lentz has been appointed Master Car-Builder, with office at Packertown, Pa.

Indiana, Bloomington & Western.—Mr. C. E. Henderson, heretofore Assistant General Manager, has been appointed General Manager.

International & Great Northern.—Maj. J. W. Goodwin has been appointed Superintendent of the Gulf division, vice R. B. Pegram, Jr., resigned to take a position on the Memphis & Charleston.

Iron Mountain & Helena.—Mr. D. Stillinger is appointed Acting Superintendent, in place of Mr. L. Hamer, resigned.

Jacksonville, Pensacola & Mobile.—Mr. J. P. Laird, previously Master Mechanic of this road, has been appointed Superintendent.

Lake Shore & Michigan Southern.—Mr. P. P. Wright has been appointed General Superintendent, in place of Mr. Charles Paine, who retired from the position some time ago.

Memphis & Charleston.—Capt. John A. Grant having resigned the position of General Superintendent of this road, the duties of that position will hereafter be performed by Maj. John F. O'Brien, General Superintendent of the East Tennessee, Virginia & Georgia Railroad.

New York Central & Hudson River.—Mr. Henry Watkeys has resigned his position of Master Mechanic at Syracuse.

New York, Pennsylvania & Ohio.—Mr. J. W. Alsop has been appointed Superintendent of the Western Division, in place of T. A. Phillips, resigned.

Northern Central.—Mr. R. H. Soule is appointed Superintendent of Motive Power of the Susquehanna, Shamokin, Elmira & Canandaigua divisions, in place of Howard Fry, resigned. His office will be at Williamsport, Pa. Mr. A. O. Dayton succeeds Mr. Sewell as Superintendent of Motive Power of the Baltimore Division.

Northern Pacific.—Mr. B. McHugh has been appointed Superintendent of the Minnesota Division, in place of H. A. Towne, resigned.

Painesville & Youngstown.—Mr. Geo. M. Patten has resigned as General Manager. His duties will be performed by the Superintendent.

Philadelphia & Erie.—Mr. Howard Fry, Superintendent of Motive Power, has resigned to accept a similar position on the New York, West Shore & Buffalo road.

Pittsburg, Ft. Wayne & Chicago.—Mr. James M. Boon, Master Mechanic Western Division, has resigned his position.

Port Royal & Augusta.—Mr. R. G. Fleming has resigned as Superintendent, to accept a position on the Savannah, Florida & Western.

Savannah, Florida & Western.—Mr. R. G. Fleming has been appointed Superintendent. He has heretofore been superintendent of the Port Royal & Augusta road.

Texas & Pacific.—Mr. George L. Sands has been appointed Assistant General Superintendent, with office at Marshall, Tex.

Wallkill Valley.—Mr. G. H. Graves has been appointed Superintendent, in place of J. H. Jones, resigned.

WANTED.—A position as Master Mechanic. The applicant has had much experience, and can give first-class references. Address NATIONAL CAR-BUILDER, 5 Dey street, New York.

WANTED.—An experienced man thoroughly capable of superintending car works. Address
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CONTINUOUS DRAW-BAR PATENTS.

The following circular has been issued by the Secretary of the Western Railroad Association:

CHICAGO, Sept. 9, 1880.

To the Members of the Association:

GENTLEMEN: Claims have been pending for several years that the Continuous Draw-Bar sold by the Continuous Draw-Bar Company under the Middleton and the Griffith and Patterson patents is an infringement of patent 71,280, granted 3d December, 1867 (reissue No. 8,085, granted 19th February, 1878), to Edward L. Caum.

This Association has continuously advised against entertaining this claim, but to quiet all questions, and at our instigation, the Continuous Draw-Bar Company has recently purchased the Caum patent, its owners inserting in the assignment a full and absolute release to all the members of the Eastern and Western Railroad Associations from any and all liability for, or on account of, any infringement heretofore of said patent.

Yours truly,
J. H. RAYMOND, Secretary, etc.

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CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.
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NAUGATUCK RAILROAD CO., G. W. Beach, Superintendent, Waterbury, Conn.
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N. Dowd, Commissary, New Haven, Conn.
UNION PACIFIC RAILROAD CO., KANSAS " " " } A. D. Clark, Purchasing Agent, Omaha, Neb.
CHICAGO, BURLINGTON & QUINCY RAILROAD CO., Wm. Irving, Purchasing Agent Chicago, Ill.
LOUISVILLE, CINCINNATI & LEXINGTON RAILROAD CO., Wm. Mahl, Purchasing Agent, Louisville, Ky.
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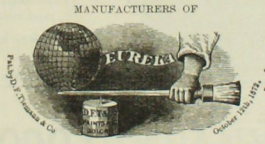
FINE COLORS, 

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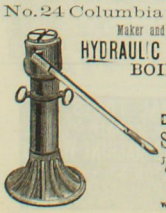

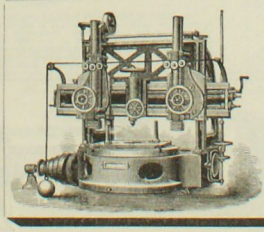

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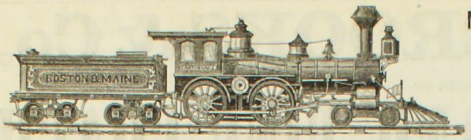

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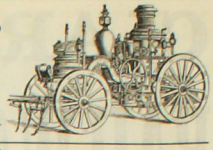

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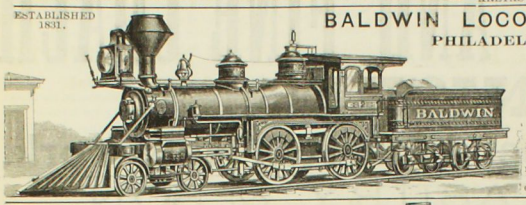

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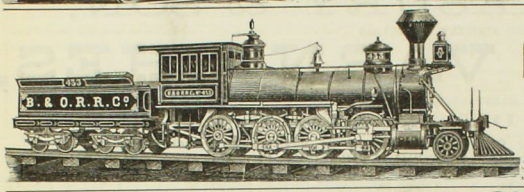

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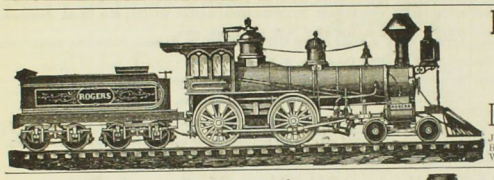

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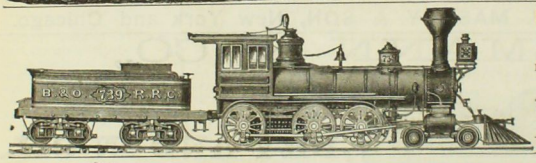

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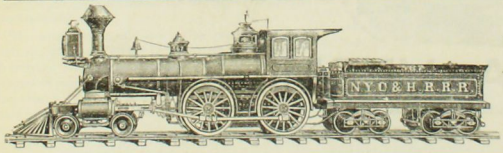

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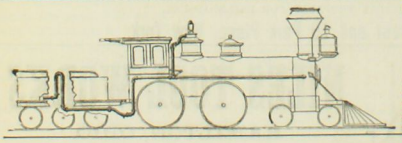

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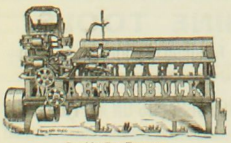

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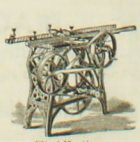

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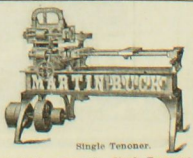

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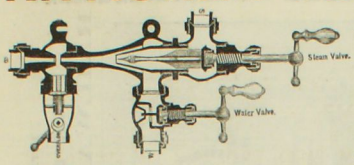

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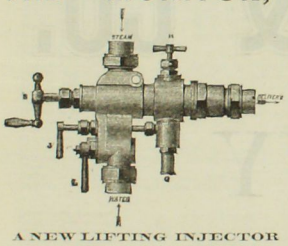

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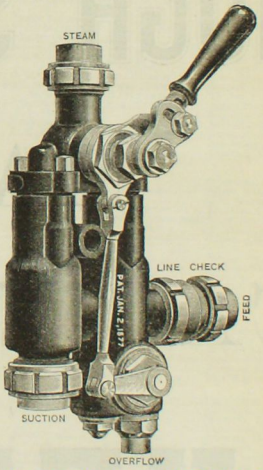

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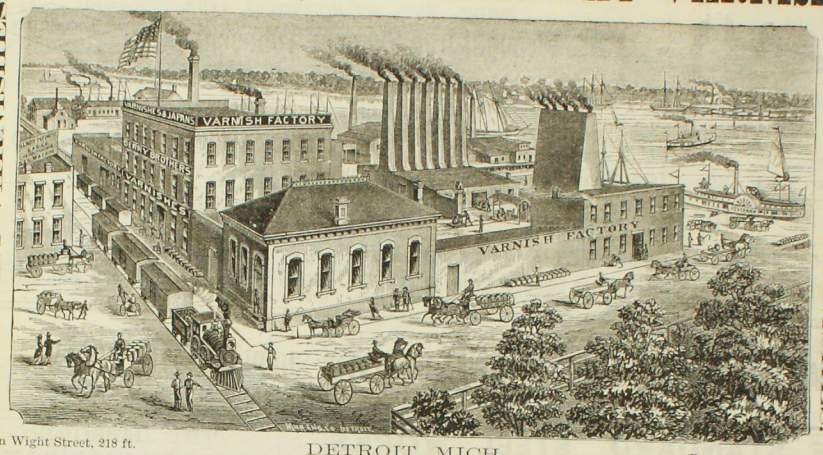

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California, Pacific & Northern	D. Rutherford	D. Rutherford	So. Vallejo, Cal.
Camden & Atlantic	Rufus Hill	S. Wills	Camden, N. J.
Canadian Pacific	†T. Irwin		Brockville, Can.
Canada Southern and Branches	*John Ortton	††John Ortton	St. Thomas, Ont.
Canada Division	‖W. A. Short	Robert Potts	St. Thomas, Ont.
U. S. Division	O. P. Dunbar		Grosse Isle, Mich.
Carolina Central	§Jas. Maglenn	S. R. Ethridge	Laurinburg, N. C.
Catasauqua & Foglesville	Tho. E. Evans	Chas. J. Holbach	Catasauqua, Pa.
Central of Georgia	D. D. Arden	R. M. Barthlemas	Savannah, Ga.
Atlanta Division	D. M. Gugel	Jas. A. Knight	Macon, Ga.
Central of New Jersey	Wm. Woodcock	George Hackett	Elizabeth, N. J.
Lehigh & Susquehanna Div.	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Central of Iowa	John Player	T. L. Seevers	Marshalltown, Ia.
Central Pacific	‡A. J. Stevens	††Benj. Welch	Sacramento, Cal.
Central Pacific		‖G. J. Turner	Sacramento, Cal.
Western Division	Geo. D. Welch	‖W. B. Ludlow	Oakland, Cal.
Visalia Division	S. Johnson		Tulare, Cal.
Sacramento & Oregon Div.	M. W. Cooley	‖Phil. Douglas	Sacramento, Cal.
Truckee Division	Geo. Gregg	‖Wm. McPherson	Wadsworth, Nev.
Humboldt Division	W. F. Smith	‖J. C. Doughty	Carlin, Nev.
Salt Lake Division	Jas. Lamb		Terrace, Utah.
Salt Lake Division		‖A. Sherburne	Ogden, Utah.
Central Vermont	§§J. M. Foss		St. Albans, Vt.
New London & Northern Div.	L. W. Davis	S. O. Banks	New London, Conn.
Rutland Division	N. L. Davis	N. L. Davis	Rutland, Vt.
Chattaroi	W. O. Pendleton	J. s. Burley	Ashland, Ky.
Chesapeake & Ohio	§§John McFarland	J. D. King	Richmond, Va.
Chesapeake & Ohio	Tho. L. Chapman	H. C. Bassinger	Huntingdon, W. Va.
Cheraw & Darlington	John Bissett	W. H. Day	Florence, S. C.
Cherokee	C. E. Scruton		Cedartown Ga.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte, Columbia & Augusta		J. C. Troeger	Columbia, S. C.
Charleston & Savannah	H. A. Ulmo	J. D. Murphy	Charleston, S. C.
Chicago & Pacific	James Penny	C. N. Code	Chicago, Ill.
Chicago & Northwestern	** Geo. W. Tilton	††William Campbell	Chicago Ill.
Iowa Division	J. O. Chapman	H. L. Preston	Clinton, Ia.
Peninsula Division	Geo. H. White		Escanaba, Mich.
Winona & St. Peters Div.	W. A. Scott	W. A. Scott	Winona, Minn
Chicago & Alton	§§Wm. Wilson		Bloomington, Ill.
Kansas City & St. Louis Div.	Wm. McPhail		Mexico, Mo.
Chicago, Burlington & Quincy	§§H. B. Stone		Aurora, Ill.
Chicago Division	W. D. Rowley		Aurora, Ill.
Galesburg Division	Robert Colville		Galesburg, Ill.
Iowa Division	Joel West		Burlington, Ia.
Iowa Division	C. W. Eckersen		Creston, Ia.
St. Louis Division	G. E. Johnson		Beardstown, Ill.
Chicago & Springfield	W. B. McKenna		Clinton, Ill.
Calcasa, Clinton, Dubuque & Minn.	E. Smedley	E. Smedley	Dubuque, Ia.
Chicago, Rock Island & Pacific	†T. B. Twombly	††B. K. Verbryck	Chicago, Ill.
Illinois Division	R. Biester	Samuel Pullman	Chicago, Ill.
Iowa Division	Jas. E. Morrill	Chas. M. Leonard	Davenport, Ia.
Keokuk & Des Moines Div.	S. W. Wakefield	Henry Kummer	Keokuk, Iowa.
Southwestern Division	R. O. Carscadin	Chas. R. Best	Trenton, Mo.
Iowa Division	J. G. Crockett		Stuart, Ia.
Chicago & West Michigan	Russell Booth		Muskegon, Mich.
Chicago & Eastern Illinois	Allen Cooke	Jas. T. Kerney	Danville, Ill.
Chicago & Iowa	H. S. Bryan		Aurora, Ill.
Chicago, Milwaukee & St. Paul	‡J. M. Lowry		Milwaukee, Wis.
La Crosse & P. Du Ch. Div.			Milwaukee, Wis.
Northern Division		John Baillie	McComb City, Miss.
Iowa & Minn. Division	J. O. Pattie	Wm. E. Kittredge	Milwaukee, Wis.
Racine & S. West Div	John Taylor	E. A. Eddy	Racine, Wis.
Sioux City & Dak. Div.	J. H. Moulton		Yankton, Dak.
Dubuque Divisi n	E. Smedley		Dubuque, Ia.
Chicago, Pekin & Southwestern	A. R. Overton		Joliet, Ill.
Chicago, Pekin & Southwestern		F. Shields	Strator, Ill.
Chicago, St. Louis & New Orleans	**W. H. Purdy	Geo. W. Baxter	McComb City, Miss.
Chicago, St. Louis & New Orleans	E. D. Anderson		McComb City, Miss
Chicago, St. Louis & New Orleans	J. M. Keith		Jackson, Tenn.
Chicago, St. Louis & New Orleans	J. F. White		Water Valley, Miss.
Chicago, St. Paul, Minn. & Omaha	Matt. Ellis		Shakopee, Minn.
Chicago, St. Paul, Minn. & Omaha	F. W. Heinselman		St. Paul, Ia.
Cincinnati, Wabash & Michigan	S. B. Tinker	S. B. Tinker	Wabash, Ind.
Cincinnati, Hamilton & Dayton	James Eckford	W. B. H. Allison	Cincinnati, O.
Cin., Ind., St. Louis & Chicago	‡J. S. Patterson	J. S. Patterson	Cincinnati, O.
Cincinnati, Richmond & Chicago	Wesley S. Brewer		Richmond, Ind.
Cincinnati Southern	J. Ivanson		Ludlow, Ky.
Cleve., Col., Cin. & Indianapolis	‡W. F. Turreff	W. F. Turreff	Cleveland, O.
Indianapolis Division	W. C. Quigley		Brightwood, Ind
Columbus & Cin. Division	W. L. Gilmore		Cleveland, O.
Cleveland & Marietta	Tho. Robertson	Tho. Robertson	Marietta, Ohio.
Cleveland & Pittsburg	§N. E. Chapman	N. E. Chapman	Cleveland, O.
Cleve., Mt. Vernon & Columbus	J. W. Holloway	J. W. Holloway	Akron, O.
Cleve., Tusc. Valley & Wheeling	Tho. Renton		Lorain, O.
Cobourg, Peterboro & Marmora	Wm. Polson		Cobourg, Canada.
Columbia & Greenville	W. J. Parrish		Helena, S. C.
Col., Hocking Valley & Tol.	I. G. Hutchins	J. M. Rockefeld	Toledo, O.
Concord	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Portsmouth	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Claremont	**J. N. Lauder		Concord, N. H.
Connecticut River	§Wm. H. Stearns		Springfield, Mass.
Connecticut Western	John C. Barton		Hartford, Conn.
Conn. & Passumpsic Rivers	L. L. Brigham	L. F. Woodard	Lyndonville, Vt.
Corning, Cowanesque & Antrim	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Cumberland Valley	A. S. Hull	G. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	N. W. Howson	Nathan Binnix	Mt. Savage, Md.

D

Dak. So. & Sioux City & Pembina	J. H. Moulton	J. H. Moulton	Yankton, Dak.
Danbury & Norwalk	N. M. George	N. M. George	Danbury, Conn.
Danville & Southwestern	C. R. Morris		Danville, Ill.
Danville, Olney & Ohio River	Louis Parisco		Kansas, Ill.
Davenport & Northwestern	H. E. Woods		Davenport, Ia.
Dayton & Union	H. S. Gordon	H. S. Gordon	Dayton, O.
Dayton & Michigan	John Black		Lima, O.
Delaware, Lackawanna & West.	Walter Dawson	Robert McKenna	Scranton, Pa.
Morris & Essex Division	W. H. Lewis		Kingsland, N. J
Morris & Essex Division		J. W. Baker	Dover, N. J.
Oswego & Syracuse Division	James Buchanan		Syracuse, N. Y.
Utica, Chenango & Susq. Div.	Tho. Thatcher		Utica, N. Y.
Bloomsburg Division	Charles Graham		Kingston, Pa.
Delaware & Chesapeake	Jos. A. Baynard		Easton, Md.
Delaware & Hudson Canal Co	**R. C. Blackall		Albany, N. Y.
Delaware & Hudson Canal Co		T. Orchard	Carbondale, Pa.
Rensselaer & Saratoga Div	J. L. Corey	Chr. Körner	Green Island, N. Y
Denver Pacific	§R. McDougall	John Clock	Denver, Col.
Denver & Rio Grande	N. W. Sample	N. W. Sample	Denver, Col.
Des Moines & Fort Dodge	John McGrayel	E. A. Avery	Grand Junction, Ia.
Detroit & Bay City	R. P. Baillie		Bay City, Mich.
Detroit, Grand Haven & Mil.	Fred Parker		Detroit, Mich.
Detroit, Lansing & Northern	G. C. Watrous	G. C. Watrous	Ionia, Mich.
Dorchester & Delaware			Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts	J. C. Haggett	J. C. Haggett	Dunkirk, N. Y.

E

East Broad Top	G. A. Haggerty		Orbisonia, Pa.
Eastern	§§Amos Pilsbury	J. D. Billings	Saler, Mass.
Eastern	D. S. Wallis		East Boston, Mass.
Eastern Kentucky	D. L. Weaver	D. L. Weaver	Riverton, Ky.
E. Tennessee, Virginia & Georgia	C. A. Hodge	Joseph Armbruster	Knoxville, Tenn.
Selma Division	B. J. Sitton	W. W. Pierce	Selma, Ala.
Alabama Cent. Division	Simon Gay	James Owens	Selma, Ala.
Ohio Div.	n		
Macon & Brunswick Div.	R. Wagnon		Macon, Ga.
Elizabeth City & Norfolk	J. S. Whitworth		Norfolk, Va.
Erie & Pittsburg	J. A. Wood	J. A. Wood	Erie, Pa.
Eureka & Palisade	J. M. Alson		Eureka, Nev.
European & North Am. (of Maine)	A. O. Bailey	A. O. Bailey	Mattawamkeag, Me.
Evansville & Terre Haute	John L. White	John L. White	Evansville, Ind.

F

Fitchburg	§§Geo. A. Cooledge	J. W. Marden	Charlestown, Mass.
Vermont & Mass. Div.	W. A. Foster		Fitchburg, Mass.
Flint & Pere Marquette	T. J. Hatswell	R. McPherson	E. Saginaw, Mich.
Florida Central	James S. McElroy	James S. McElroy	Jacksonville, Fla.
Fort Wayne & Jackson	C. W. Hollister	C. W. Hollister	Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	Wm. McPhail	Wm. McPhail	Fort Wayne, Ind.

G

Galv., Harrisburg & San Antonio	§§D. T. Davis	Jas. Alexander	Harrisburg, Tex.
Galveston, Houston & Henderson	J. G. Conlon		Galveston, Tex.
Geneva, Ithaca & Sayre	J. N. Weaver		Waverly, N. Y.
Geneva, Ithaca & Sayre		J. S. Lentz	Packerton, Pa.
Georgia	John S. Cook	T. M. Preval	Augusta, Ga.
Grand Haven	R. Booth	R. Booth	Muskegon, Mich.
Grand Tower & Carbondale	Hugh Smith	Hugh Smith	Grand Tower, Ill.
Grand Trunk	‡Herbert Wallis	Wm. McWood	Montreal, Canada.
Grand Trunk	Warren Noyes		Gorham, N. H.
Grand Trunk		Duncan Menish	Portland, Me.
Chicago Division		*K. Blackwell	Battle Creek, Mich.
Grand Rapids & Indiana	J. M. Dyson		Fort Wayne, Ind.
Grand Rapids & Indiana	J. R. Fish	J. R. Fish	Grand Rapids, Mich.
Great Western of Canada	†C. K. Domville		Hamilton, Can.
Great Western, of Canada	‡ Hanson	Henry Childs	London, Ont.
Green Bay, Winona & St. Paul	Edw. Osborne		Green Bay, Wis
Gulf, Colorado & Santa Fe	Geo. B. Nicols	W. H. Martin	Galveston, Texas.
Gulf, Western Texas & Pacific	James Mooney		Luero, Texas.

H

Hanover Junction & Gettysburg	John J. Bingley	John J. Bingley	Hanover, Pa.
Hannibal & St. Joseph	Jas Long	Jas. Long	Hannibal, Mo.
Housatonic	N. Slingland	J. J. Ferris	Falls Village, Coun.
Houston, East & West Texas			Houston, Tex.
Houston & Texas Central	L. C. Noble	James McGee	Houston, Tex.
Huntingdon & Broad Top	Wm. Barkla		Saxton, Pa.

I

Illinois Central	**S. J. Hayes	W. B. Snow	Chicago, Ill.
Chicago Division	Henry Schlacks		Chicago, Ill.
North Division	J. B. Edams		Amboy, Ill.
Iowa Division	Thomas W. Place		Waterloo, Ia.
Springfield Division	W. B. McKenna		Clinton Ill
Illinois Midland	J. G. Clifford		Paris, Ill.

Railroad.	Master-Mechanic.	Master Car-Builder.	Residence.
Illinois & St. Louis	J. H. Smith		Belleville, Ill.
Illinois & St. Louis		Charles Rothe	E. St. Louis, Ill.
Indianapolis, Decatur & Springfield	Pulaski Leeds	Pulaski Leeds	Indianapolis, Ind
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Indianapolis & St. Louis	A. J. Sanborn	Geo. H. Pratt	Mattoon, Ill.
Indiana, Bloomington & Western	E. Hiserodt	E. Hiserodt	Urbana, Ill.
Ohio Division	Jos. S. Porter		Sandusky, Ohio.
International & Great Northern	R. H. Johnson	H. H. Sessions	Palestine, Tex.
Intercolonial	†H. A. Whitney	Edw. Shaffer	Moncton, N. B.
ron	Perry Scott	Clem Roetling	Ironton, O.

J

Jacksonville Pensacola & Mobile	J. P. Laird		Tallahassee, Fla.
Jeffersonville, Mad. & Indianapolis	Wm. Swanston	Edw. Austin	Jeffersonville, Ind.
Jacksonvile, N. West. & S. East	R. J. Miller		Jacksonville, Ill.
Joplin	P. T. Butterly	P. T. Butterly	Girard, Kan.
Junction & Breakwater	J. A. Macuire		Lewes, Del.

K

Kansas City, Fort Scott & Gulf	J. S. McCrum	A. N. Montier	Kansas City, Mo.
Kansas City, Lawrence & South'n	J. S. McCrum		Kansas City, Mo.
Kan. City, St. Jo. & Coun. Bluff	F. A. Chase	Thos. Aylesbury	St. Joseph, Mo.
Kansas Central	Wm. McCall		Leavenworth, Kan.
Kaw Valley Division	James Long		Armstrong, Kan.
Smoky Hill Division	John B. Daily		Ellis, Kan.
Kentucky Central	J. H. Setchel	J. L. Hackathorn	Covington, Ky.
Knox & Lincoln	Wm. A. Field	C. L. Turner	Bath, Me.

L

Lake Erie & Western	†H. L. Cooper		Lima, Ohio.
Lake Ontario Southern	Geo. Thompson	Wm. Currier	Sodus Point, N. Y.
Lake Shore & Michigan Southern	Lianus Sedgley	††John Kirby	Cleveland, Ohio.
Michigan Southern Division	Geo. W. Stevens		Elkhart, Ind.
		Frank O. Bray	Adrian, Mich.
Toledo Division	J. M. Sanborn	W. O. Smith	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withycombe	Cleveland, Ohio.
Buffalo Division	J. S. Graham	A. C. Robson	Buffalo, N. Y.
Lehigh Valley	John I. Kinsey		South Easton, Pa.
Lehigh Valley	P. Hofecker		Weatherly, Pa.
Lehigh Valley	John Campbell		Delano, Pa.
Lehigh Valley	D. D. Clark		Hazleton, Pa.
Lehigh Valley	A. Mitchell		Wilkesbarre, Pa.
Lehigh Valley		Jno. S. Lentz	Packerton, Pa.
Little Rock & Fort Smith	James Eblin	James Malone	Argenta, Ark.
Little Rock, Miss. River & Texas	F. Hufsmith		Arkansa's City, Ark.
Los Angeles & Independence	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Louisville, New Albany & Chicago	Josiah Bettis		New Albany Ind.
Long Island	C. A. Thompson	C. A. Thompson	L. Isl'd City, N. Y.
Louisiana Western	B. B. Harrop		Vermilionville, La.
Louisville, Cincinnati & Lexing'n	H. Middleton		Louisville, Ky.
Louisville & Nashville	**Reuben Wells	H. Middleton	Louisville, Ky.
Nashville & Decatur Div	W. H. Thomas	J. P. Furguson	Nashville, Tenn.
South & North Ala. Div	C. W. White		Birmingham, Ala
St. Louis Div	Thos. Walsh	W. H. H. Price	Mt. Vernon, Ill.
Clarksville Division			Bowling Green, Ky
Memphis & Ohio Div	Wm. Pike		Memphis, Tenn
Mobile & New Orleans Div	Wm. Adair		Mobile, Ala.

M

Maine Central	Ira K. Russell		Waterville, Me.
Maine Central		C. H. Kenison	Augusta, Me.
Manchester & Lawrence	J. T. Gordon	J. T. Gordon	Concord, N. H.
Manhattan Beach			Bay Ridge, L. I.
Manhattan Elevated	T. W. Peeples	H. A. Webster	New York, N. Y.
Marietta & Cincinnati	E. M. Bosley	E. M. Bosley	Chillicothe, Ohio.
Marquette, Houghton & Onton'gn	W. H. Williams	H. D. Lyons	Marquette, Mich.
Memphis, Paducah & Northern	G. M. Taylor	G. M. Taylor	Paducah, Ky.
Memphis & Little Rock	Thos. Rennell	P. Twitchell	Argenta, Ark.
Memphis & Charleston	§H. N. Burford	J. J. Kascy	Memphis, Tenn.
Mexican National	J. C. Munro		City of Mexico.
Michigan Central	S. H. Edgerly		Jackson, Mich.
Michigan Central		††Robert Miller	Detroit, Mich.
Midland of Canada	Wm. Marling		Port Hope, Ont.
Milwaukee, Lake Shore & West'n	S. Chandler		Manitowoc, Wis.
Minneapolis & St. Louis	Tho. Downing	Tho. Downing	Minneapolis, Minn.
Mineral Range	George F. Coon		Hancock, Mich.
Mississippi & Tennessee	J. C. Ramsey	S. J. Bolton	Memphis, Tenn.
Missouri & Western	A. C. Persing		Pierce City, Mo.
Missouri Pacific	§§John Hewitt	John Hodge	St. Louis, Mo.
Missouri Pacific	R. D. Grant		St. Louis, Mo.
Missouri Pacific	Geo. W. Walshe		Sedalia, Mo.
Missouri Pacific	H. V. Faries		Atchison, Kan.
Mobile & Montgomery	C. W. White	Lewis Barham	Montgomery, Ala.
Mobile & Girard	J. C. Albrecht	A. J. Nix	Columbus, Ga.
Mobile & Ohio	R. H. Briggs	J. T. Booth	Whistler, Ala.
Mobile & Ohio	John Fitzgerald		Macon, Miss.
Mobile & Ohio	M. T. Carson		Jackson, Tenn.
Montgomery & Eufaula	D. M. Gugel	James A. Knight	Macon, Ga.
Morgan's Louisiana & Texas	N. Tilton	Wm. O'Brien	Algiers, La.

N

Nashua & Lowell	S. A. Davis	S. A. Davis	Nashua, N. H.
Nashville, Chattan'ga & St. Louis	James Cullen	J. G. Sawyer	Nashville, Tenn.
Naugatuck	Henry Hanford	George W. Gray	Bridgeport, Ct.
Nebraska	D. Hawksworth		Plattsmouth, Neb.
Nevada Central	Z. T. Sprigg		Battle Mountain, Nev.
Newburg, Dutchess & Connecticut	W. J. Vanbuskirk		Dutchess J'n, N. Y.
New Brunswick	Jesse Mathews	T. N. Burpee	Gibson, N. B.
New Brunswick & Canada	Tho. Armstrong	G. Houlton	St. Andrew's, N. B.
New Haven & Northampton	Henry Fox	John Sweeny	New Haven, Ct.
New Jersey & New York	J. S. Drake		Jersey City, N. J.
New Jersey Southern	Rufus Blodgett		Manchester, N. J.
New York, Lake Erie & Western	§F. M. Wheeler		Susquehanna, Pa.
New York, Lake Erie & Western	J. H. Vreeland		Jersey City, N. J.
New York, Lake Erie & Western		J. N. Mileham	Jersey City, N. J.
New York, Lake Erie & Western	J. Van Vechten	J. Van Vechten	Port Jervis, N. Y.
New York, Lake Erie & Western	V. Blackburn		Susquehanna, Pa.
New York, Lake Erie & Western		D. B. Goodell	Elmira, N. Y.
New York, Lake Erie & Western	George H. Griggs		Hornellsville, N. Y.
New York, Lake Erie & Western	G. B. Ross	M. Wilder	E. Buffalo, N. Y.
New York, Lake Erie & Western	Jos. Bradt		Rochester, N. Y.
New York & Harlem	Theo. Weicher		New York, N. Y.
New York & Harlem		C. E. Garey	Morrisania, N. Y.
New York Central & Hud. River	§§Wm. Buchanan	††Leander Garey	New York, N. Y.
New York Central Division	§§O. B. Van Vorst	D. Holt	West Albany, N. Y.
New York Central Division			Syracuse, N. Y.
New York Central Division	§§Amos Gould	E. A. Olmstead	E. Buffalo, N. Y.
New York Central Division	§§S. L. White	Richard Donaly	Niagara Falls, N. Y.
Hudson River Division	§§Wm. Buchanan	Peter Smith	New York, N. Y.
New York Central Division		C. H. Burchard	E. Rochester, N. Y.
New York, Ontario & Western	Edw. Minshull	Edw. Minshull	Middletown, N. Y.
New York & New England	§§Geo. E. Bryden	Elias E. Pratt	Boston, Mass.
Norwich & Worcester Div	Richard Coburn		Norwich, Ct.
Hartford Division	E. M. Hunnewell	S. Howland	Hartford, Conn.
New York, N. Haven & Hartford			
New York & New Haven Div.	§§H. Kettendorf	James Denver	New Haven, Conn.
Hartford Division	§§Jno. Henney, Jr.	John Henney, Jr.	Hartford, Ct.
New York, Penn. & Ohio	†William Fuller	††Wm. Fuller	Cleveland, O.
New York, Penn. & Ohio	J. A. Cooper	D. S. Dockstader	Meadville, Pa.
New York, Penn. & Ohio	N. Wright	W. G. Huggard	Cleveland, O.

Railroad.	Master-Mechanic.	Master Car-Builder.	Residence.
New York, Penn. & Ohio		S. V. Smith	Kent, O.
New York, Penn. & Ohio	William Hill	J. W. Holmes	Galion, O.
New York, Penn. & Ohio		J. T. Fosdick	Salamanca, N. Y
New York, Penn. & Ohio		Geo. Wilson	Dayton, O.
N. York, Susquehanna & Western		W. C Ennis	Wortendyke, N. J.
New York, Providence & Boston	J. H. Anderson	J. H. Anderson	Providence, R. I.
Norfolk & western			
Norfolk & Peter. Division	J. T. Robinett	J. T. Robinett	Petersburg, Va.
Virginia & Tenn. Division	F. Sterk	W. A. Morgan	Lynchburg, Va.
Northern Central	§§A. J. Dayton		Baltimore, Md.
Northern Central	R. H. Soule	G. W Demarest	William-port, Pa.
Northern Central	J. M. Coale		Baltimore, Md.
Northern Central	James Strode	J. C. Dyott	Elmira, N. Y.
Northern New Hampshire	**Jas. N. Lauder		Concord, N. H.
Northern Pacific	**A. P. Farrar	A. P. Farrar	Brainerd, Minn.
Dakota Division	A. Rupert		Fargo, Dak.
Pacific & P. Oreille Div	C. Z. Sanders	Tho. G. Davis	New Tacoma, W.T
Northeastern		W. H. Day	Florence, S. C.
North Pacific Coast	James Walch		Sancelito, Cal.
Northern & Northwestern	P. Clark		Toronto, Can.

O

Ogdensburg & Lake Champlain	Abraham Klohs	A. Klohs	Malone, N. Y.
Ohio Central	J. B. Morgan		Bucyrus, O.
Ohio & Mississippi	Arthur Donaldson		Vincennes, Ind.
Ohio & Mississippi		J. P. Coulter	Aurora, Ind.
Cincinnati Division	John Thumser		Seymour, Ind.
Springfield Division	J. W. Stokes		Pana, Ill.
Old Colony	J. K. Taylor	A. Gleason	Boston, Mass.
Northern Division	Geo. W. Reynolds	Sam. Stevens	Taunton, Mass.
Olean, Bradford & Warren	Chas. Turner	Chas. Turner	Olean, N. Y
Oregon & California	§§J. Brandt		Portland, Oregon.
Oregonian	Jas. Walch		Portland, Oregon.
Oregon Railway & Navigation Co.	J. F. Curtis	Chas. Phipps	The Dalles, Oregon

P

Paducah & Elizabethtown	W. D. Robb	W. D. Robb	Elizabethtown, Ky.
Painesville & Youngstown	J. H. Jones		Painesville, O.
Panama	Thos. S. O'Brien		Aspinwall, U. S. C
Parker & Karns City	Philip Davies	Wm. Wolford	Parker City, Pa.
Pensacola & Selma	R. H. Kelly		Selma, Ala.
Pennsylvania	§§T. N. Ely		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa
Pennsylvania	E. L. Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Stratton	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	J. G. Stewart	Pittsburg, Pa.
New Jersey Division	L. A. Bosdevex	E. F. Bosdevex	MeadowShops, N. J
New Jersey Division		David H. Baker	Jersey City, N. J.
New Jersey Division	§§H. S. Hayward		Jersey City, N. J.
New Jersey Division	Tho. Kerr	P. S. Bogart	So. Amboy, N. J.
New Jersey Division	R. McDowell		Lambertville, N. J.
New Jersey Division	W. McAllister		Camden, N. J.
West Penn. Division	C. B. Street	M. H. Falls	Blairsville, Pa.
Peoria, Decatur & Evansville	P. Reilly	J. S. Tufts	Mattoon, Ill.
Petersburg	R. B. Andrew	J. W. Fleming	Petersburg, Va.
Philadelphia, Wilmington & Balt	S. A. Hodgman	Wm. Lundgren	Wilmington, Del.
Central Division	S. D. Dasfield	S. D. Dasfield	Chester, Pa.
Philadelphia & Atlantic City	J. W. Wright	E. Lippincott	Camden, N. J.
			Williamsport, Pa.
Philadelphia & Erie	W. F. Beardsley		Sunbury, Pa.
	W. L. Forster		Renovo, Pa.
	W. T. Smith		Erie, Pa.
Philadelphia & Reading	*L. B. Paxson	John H. Rankin	Reading, Pa.
Philadelphia & Reading	Jackson Richards		Philadelphia, Pa.
Catawissa Branch	W. H. Ellis	C. D. Ellis	Catawissa, Pa.
Piedmont Air Line	‡R. D. Wade		Richmond, Va.
Rich. & Danville Div		J. B. Vaughan	Richmond, Va.
North Carolina Div		J. C. Holt	Richmond, Va.
Pittsburg, Cincinnati & St. Louis	§§G. W. Rhodes		Comp. Shops, N. C.
Little Miami Division		M. P. Ford	Columbus, O.
Col., Cin. & Ind. Division	Robert Curtis	Tho. Chamberlin	Columbus, O.
Col., Cin. & Ind. Div	Geo. H. Prescott	Chas. H. Starr	Logansport, Ind.
Col. Cin. & Ind. Division		H. M. St. Clair	Indianapolis, Ind.
Cin. & Musk. Val. Division	Leroy Kells	Daniel Jewell	Lancaster, O.
Pitts. Cin. & St. Louis Divis'n	Ross Kells		Dennison, O.
Pitts. Cin. & St. Louis Divis'n		A. K. Mansfield	Steubenville, O.
Pittsburg, Fort Wayne & Chicago	Geo. J. Parkin	John Marquis	Allegheny, Pa.
Pittsburg, Fort Wayne & Chicago		Israel Lee	Fort Wayne, Ind
Pittsburg, Fort Wayne & Chicago	Geo. W. Lowe	J. J. Kirkland	Crestline, O.
Pittsburg, Titusville & Buffalo	H. J. Bookhammer	John Monks	Oil Cities, Pa.
Pittsburg, Virginia & Charleston	Wm. Llninger		Pittsburg, Pa.
Pittsburg & Western	D. C. Courtney		Zelienople, Pa.
Pittsburg & Lake Erie	S. W. Haines		Pittsburg, Pa.
Portland & Ogdensburg	Geo. H. Foor	W. G. Brewer	Portland, Me.
Portland & Rochester	E. H. C. Tompson	David Dow	Portland, Me.
Port Dover & Lake Huron	H. M. Aldrich		Woodstock, Ont.
Port Royal & Augusta	Geo. Riley	J. H. Milton	Port Royal, S. C.
Poughkeepsie, Hartford & Boston	John L. Driscoll		Poughkeepsie, N.Y
Prince Edward Island	A. Stronach	D. M. Fraser	Charlotte'n, P. E.I
Providence & Springfield	G. T. Richardson		Pascoag, R. I.
Providence & Worcester	A. Griggs	A. Griggs	Providence, R. I.
Providence, Warren & Bristol	Rufus Smith	Rufus Smith	Bristol, R. I.

Q

Quebec, Mont., Ottawa & Occidental	†A. Davis		Montreal, Can
Quincy, Missouri & Pacific			Kirksville, Mo.

R

Raleigh & Augusta Air-Line	**B. R. Harding		Raleigh, N. C.
Raleigh & Gaston	**B. R. Harding		Raleigh, N. C.
Rhinebeck & Connecticut	John Dykeman	John H. Decker	Rondout, N. Y.
Rich., Fredericksburg & Potomac	H. Khun	W. H. Trainham	Richmond, Va.
Richmond & Allegheny	Geo. D. Harris		Richmond, Va.
Richmond & Danville	See Piedmont Air-Line.		
Richmond & Petersburg	John O'Brien	H. L. Carter	Richmond, Va.
Rich., York River & Chesapeake	A. B. Armstrong	A. B. Armstrong	Richmond, Va.
Rio Grande	G. W. Rendall	M. Markwood	Brownsville, Tex.
Rochester & Pittsburg	J. P. Hovey		Rochester, N. Y.
Rock Island & Peoria	Joseph Elder		Peoria, Ill.
Rome, Watertown & Ogdensburg	Geo. H. Haselton	Geo. H. Haselton	Oswego, N. Y.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.

S

Saginaw Valley & St. Louis			St. Louis, Mich.
San Francisco & Northern Pacific	Ed. Reynolds	John Martin	Donahue, Cal.
Savannah, Florida & Western	§Jas. D. Hollister	P. N. Rayral	Savannah, Ga.
Savannah & Memphis	R. A. Bridges		Opelika, Ala.
Scioto Valley	C. H. Cory	C. H. Cory	Portsmouth, O.
Seaboard & Roanoke	§§M. M. Pendleton		Portsmouth, Va.
Selma, Marion & Memphis	J. M. Levis		Marion, Ala.
Shenango & Allegheny	Edw. Richardson		Greenville, Pa.
Shepaug	C. M. Allen		Litchfield, Ct.
Sioux City & Pacific	C. H. Foster	C. H. Foster	Missouri Valley, I
Southern Pacific			
Northern Division	J. T. Wilson	F. N. Bellisle	San Francisco, Ca
Los Angeles & Yuma Div	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Tulare Division	S. Johnson		Tulare, Cal.
South Carolina	§F. J. Cochrane	Geo. H. Gramling	Charleston, S. C
Southern Central	Chas. G. Brown	H. Mooney	Auburn, N. Y.
Southeastern (Canada)	A. G. Eastman		Richford, Vt.
Southwestern of Georgia	D. M. Gugel	James A. Knight	Macon, Ga.
South Pacific Coast	E. L. Reese	E. L. Reese	Newark, Ca

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Spartanburg, Union & Columbia	Wm. Platt	W. B. Brown	Spartanburg, S. C.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Stockton & Copperopolis	M. S. Webb	M. S. Webb	Stockton, Cal.
St. Croix & Penobscot	G. H. Corsen	H. C. Tincker	Milltown, Me.
St. Johns	Jas. M. Owens		St. Augustine, Fla.
St. Johnsbury & Lake Champlain	Geo. E. Howe		St. Johnsbury, Vt.
S. Joseph & Des Moines	F. A. Chase		St. Joseph, Mo.
St. Joseph & Western	E. Sleppy	E. Hansen	So. St. Joseph, Mo
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis, Iron Mount. & So	**O. A. Haynes	Oscar Doolittle	St. Louis, Mo.
Arkansas Division	L. Finlay	L. Finlay	Little Rock, Ark.
Missouri Division	W. H. Harris	H. M. Aldrich	De Soto, Mo.
St. Louis, Alton & Terre Haute	**Beriah Warren		St. Louis, Mo.
St. Louis, Salem & Little Rock	Thomas Everson	A. W. Grosvernor	Steelville, Mo.
St. Louis & San Francisco	M. Kearney	M. Kearney	N. Springfield, Mo
St. Louis, Keokuk & Northwest'n	Wm. Foley		Keokuk, Iowa.
St. Louis Bridge Co. & Tunnel R.R.	H. M. Smith		St. Louis, Mo.
St. Paul & Duluth	W. McFarland	John Hill	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	A. A. Ackerly		St. Paul, Minn.
Sussex & Blairstown	E. H. Osborn	R. L. Sutton	Newton, N. J.
Syracuse, Binghamton & N. Y.	James Buchanan	James Buchanan	Syracuse, N. Y.
Syracuse, Chenango & New York	Geo. W. West	Wm. J. McMichael	Syracuse, N. Y.

T

Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
T. H. & Indianapolis (Vandalia Line.) Indianapolis Div.	§§C. R. Peddle	E. D. Carter	Terre Haute, Ind.
	Clinton Idler		Indianapolis, Ind
Vandalia Div.	Chas. Butler		Effingham, Ill.
Logansport Division	A. W. Quackenbush		Logansport, Ind.
Texas & New Orleans	D. C. Smith	J. M. Mather	Houston, Texas.
Texas & Pacific	‡‡ F. Sechler	H. H. Sessions	Marshall, Texas.
So. Jeff. & Shreveport Div.	H. J. Bearup		Marshall, Tex.
Trans-Continental Div.	E. Newall		T-xarkana, Ark.
Tioga	Pere Briny	D. H. Stratton	Blossburg, Pa.
Toledo, Delphos & Burlington	F. M. Mast		Delphos, O.
Toronto, Grey & Bruce	†David Preston		Toronto, Can.
Toronto & Nipissing	J. Haggas		Toronto, Can.
Troy & Boston	Z. B. Davis	R. V. Coon	Troy, N. Y.

U

Ulster & Delaware	J. B. Dykeman	Jno. H. Decker	Rondout, N. Y.
Union Pacific	‡‡H. H. Congdon	‡‡Geo. E. Stevens	Omaha, Neb.

Railroad.	*Master Mechanic.*	*Master Car Builder.*	*Residence.*
Eastern Division	Robt. McConnell	A. M. Collett	Omaha, Neb.
Eastern Division		H. P. Makely	Grand Island, Neb
Mountain & Laramie Div	T. A. Davis	John E. Davis	Cheyenne, Wy. T.
Western Division		R. V. Brinkley	Evanston, Wy. T.
Colorado Division	Frecl. Metzheimer	E. G. Thomas	Golden, Col.
Denver, S. Park & Pacific Div.	J. H. Kirk		Denver, Col.
Kansas Division	**John MacKenzie	T. B. Roberts	Armstrong, Kan
Kansas Division	John B. Daily		Ellis, Kan.
Kaw Valley Division	Jas McKenzie		Armstrong, Kan.
Utah Central	W. B. Armstrong	Sam. S. Tucker	Salt Lake City.
Utah Western	Robert Anderson		Salt Lake City, U
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Ithaca & Elmira	Geo. W. Cleveland	F. W. Magargil	Breesport, N. Y.

V

Valley	B. C. Bosworth	Chas. Blanchard	Cleveland, O.
Vicksburg & Meridian	Jas. B. Browne		Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	W. Bell Smith	W. Bell Smith	Monroe, La.
Virginia & Truckee	I. N. Fording		Carson, Nev.
Virginia Midland	J. E. Waddey	J. T. Nallo	Alexandria, Va.

W

Wabash, St. Louis & Pacific	Chauncy R. Morris		Fort Wayne, Ind
Wabash, St. Louis & Pacific	Jacob Johann	B. B. Rose	Springfield, Ill.
Wabash, St. Louis & Pacific	W. O. Hewitt	R. M. Hemphill	Peoria, Ill.
Wabash, St. Louis & Pacific		U. H. Kohler	Toledo, Ohio.
Wabash, St. Louis & Pacific		J. S. Hazen	Stanbery, Mo.
Wabash, St. Louis & Pacific	W. H. Selby	C. S. Beck	Moberly, Mo.
Wallkill Valley	John Dykeman	Jno. H. Decker	Rondout, N. Y.
Washington & Ohio	Edward Dunn	John Harrison	Alexandria, Va.
Welland	James Taylor	Wm. H. Fay	St. Catharine, C.W
Western & Atlantic	John H. Flynn	W. G. Grambling	Atlanta, Ga.
Western Maryland	†David Holtz	J. H. Nussear	Union Bridge, Md.
Western North Carolina	Geo. W. Gates		Salisbury, N. C.
Western, of Alabama	Robert King	F. M. Wade	Montgomery, Ala.
Western R. R. N. C.	Isaac W. Clark	Isaac W. Clark	Fayetteville, N.C.
Western Union	John Taylor	E. A. Eddy	Racine, Wis.
West Feliciana	J. A. Tilton	J. A. Tilton	Bayou Sara, La.
West Jersey	W. McAllister	C. C. Williams	Camden, N. J.
White Water	§L. W. Wingert		Harrison, O.
Wilmington, Columbia & Augusta	John Bisset	W. H. Day	Florence, S. C.
Wilmington & Welden	John Bisset	C. R. Clowe	Wilmington, N. C.
Wisconsin Central	§§J. B. Henney	J. B. Henney	Stevens' Pt, Wis.
Wisconsin Valley	M. B. Snyder		Tomah, Wis.
Worcester & Nashua	John G. Brady	John G. Brady	Worcester, Mass.

IN THE

PATENT FIGHT

BETWEEN

D. A. HOPKINS, of 113 Liberty St., N. Y.

PATENTEE AND MANUFACTURER OF

SELF-FITTING JOURNAL BEARINGS

AND

T. V. LE ROY,

A SECOND DECISION WAS RENDERED JUNE 7, 1881,

IN FAVOR OF HOPKINS.

The closing paragraphs of said decision read as follows:

"As the proofs stand, therefore, Hopkins was the first to conceive, the first to disclose to others, the first to embody in models, the first to reduce to practice, and the first to apply for a patent. Le Roy was first to obtain a patent, but under circumstances which do not give him the prima facie case which a patent usually implies."

"We must find priority of invention to be with D. A. Hopkins, and affirm the examiner's decision."

H. H. BATES,
R. L. B. CLARKE,
R. G. DYRENFORTH,
Examiners-in-Chief.

A pretended report of an interview with myself, relative to the above matter, published last month in a new-fledged railroad paper, is thoroughly misleading and almost wholly false.

D. A. HOPKINS.

Directory of Railway Superintendents and Purchasing Agents

THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—* General Manager. † General Superintendent. ‡ Assistant General Superintendent. § Assistant Superintendent. ** Superintendent of Transportation. §§ Assistant General Manager.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
A			
Adirondack	C. E. Durkee		Saratoga, N. Y.
Alabama Great Southern	*John Scott	R. W. Healey	Chattanooga, Tenn.
Alabama Great Southern	Chas. B. Wallace		Chattanooga, Tenn.
Albany & Susquehanna	*C. F. Young		Honesdale, Pa.
Alleghany Valley	David McCargo	David McCargo	Pittsburg, Pa.
Anderson, Lebanon & St. Louis	Jas. A. Larnerd		Anderson, Ind.
Arkansas Midland	*A. H. Johnson		Helena, Ark.
Asheville & Spartanburg	James Anderson		Spartanburg, S. C.
Ashtabula & Pittsburg	J. M. Kimball		Ashtabula, O.
Atchison, Topeka & Santa Fe	*C. C. Wheeler	F. M. Smith	Topeka, Kan.
Atchison, Topeka & Santa Fe	D. J. Chase		Topeka, Kan.
Eastern Division	C. M. Rathburn		Topeka, Kan.
Colorado Division	W. W. Borst		La Junta, Col.
Las Vegas Division	Tho. J. Seely		Las Vegas, N. M.
Rio Grande Division	Fred. Leach, Jr		San Marcial, N. M.
Atlanta & Charlotte Air Line	*G. J. Foreacre	G. J. Foreacre	Atlanta, Ga.
Atlanta & West Point	*Cecil Gabbett		Atlanta, Ga.
Atlantic & North Carolina	A. B. Andrews		Newbern, N. C.
Atlantic & Pacific	F. W. Smith		Albuquerque, N. M.
Atlantic & Pacific		D. B. Sibley	Chicago, Ill.
Atlantic, Tennessee & Ohio	J. J. Gormley		Charlotte, N. C.
B			
Baltimore & Ohio	**W. M. Clements	N. S. Hill	Baltimore, Md.
Ohio & Chicago Division	*B. Dunham		Newark, O.
Ohio & Chicago Division	W. C. Quincy		Newark, O
Pittsburg Division	Tho. M. King		Pittsburg, O.
Bangor & Piscataquis	Arthur Brown		Bangor, Me.
Bath & Hammondsport	M. H. Hall		Hamm'dsp't, N. Y.
Bedford, Sp'gville, Owensb'g & Bd.	Jas. W. Kennedy	Jas. W. Kennedy	Bedford, Ind.
Bellefonte & Snow Shoe	Daniel Rhoads		Bellefonte, Pa.
Bell's Gap	Robert G. Ford		Bellwood, Pa.
Belt R. R. & Stock Yard	*M. A. Downing	M. A. Downing	Indianapolis, Ind
Bennington & Rutland	F. C. White	F. C. White	Rutland, Vt.
Boston, Revere Beach & Lynn	E. H. Whorf		Boston, Mass.
Boston & Albany	*Wm. Bliss		Boston, Mass.
Boston & Albany	C. O. Russell		Springfield, Mass.
Boston & New York Air Line	Jos. H. Franklin		New Haven, Conn.
Boston & Providence	A. A. Folsom	A. A. Folsom	Boston, Mass.
Boston Concord & Montreal	*J. A. Dodge		Plymouth, N. H.
Boston, Concord & Montreal	§W. A. Stowell	J. Thomas Vose	Boston, Mass.
Boston, Hoosac Tunnel & Western	J. L. Wellington		Mechanicsville, N. Y.
Boston & Maine	J. T. Furber	J. T. Furber	Boston, Mass.
Boston & Lowell	C. E. A. Bartlett	F. H. Nourse	Boston, Mass.
Boston, Barre & Gardner	H. M. Witter	H. M. Witter	Worcester, Mass.
Bradford, Bordell & Kinzua	B. C. Williams	B. C. Williams	Bradford, Pa.
Brooklyn, Flatbush & Coney Isl'd.	Robert White		Brooklyn, N. Y.
Brunswick & Albany	R. D. Meader		Brunswick, Ga.
Burlington & Mo. River (in Neb.)	*A. E. Touzalin	G. Hargreaves	Omaha, Neb.
Burlington & Mo. River (in Neb.)	Geo. W. Holdrege		Omaha, Neb.
First Division	J. O. Phillipi		Lincoln, Neb.
Burlington, Cedar Rapids & Nor'n.	C. J. Ives	Theo. Stickney	Cedar Rapids, Ia.
Burlington & Northwestern	John F. Gerry	John F. Gerry	Burlington, Ia.
Burlington & Southwestern	J. W. Smith	J. W. Smith	Burlington, Ia.
Buffalo & Southwestern	*John F. Moulton		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Geo. S. Gatchell	J. H. Pool	Buffalo, N. Y.
C			
Cairo & St. Louis	Chas. Hamilton	Chas. Hamilton	St. Louis, Mo.
Cairo & Vincennes	Roswell Miller	G. H. Lyman	Cairo, Ill.
California Northern	§J. A. Fillmore		Sacramento, Cal.
Camden & Atlantic	F. A. Lister	F. A. Lister	Camden, N. J.
Canadian Pacific	*Archer Baker		Brockville, Can.
Canada Southern	*Wm. P. Taylor		Buffalo, N. Y.
Canada Southern		A. F. Howland	St. Thomas, Ont.
U. S. Division	E. P. Murray		Toledo, O.
Canada Division	W. E. Carroll		St. Thomas, Ont.
Cape Fear & Yadkin Valley	L. C. Jones		Fayetteville, N. C.
Canadian Pacific	A. B. Stickney	W. R. Baker	Winnepeg, Man.
Carolina Central	V. Q. Johnson	C. H. Roberts	Wilmington, N. C.
Catasauqua & Fogelsville	C. W. Chapman	C. W. Chapman	Catasauqua, Pa.
Cayuga Southern	W. Stevenson		Sayre, Pa.
Cayuga & Susquehanna	W. R. Humphreys		Ithaca, N. Y.
Central Pacific	*A. N. Towne		San Francisco, Cal.
Central Pacific	J. A. Fillmore		San Francisco, Cal.
Central Pacific		J. R. Watson	Sacramento, Cal.
Western & Visalia Divisions	A. D. Wilder		Oakland, Cal.
Truckee Division	Frank Free		Wadsworth, Nev.
Humboldt Division	G. W. Coddington		Carlin, Nev.
Salt Lake Division	A. G. Fell		Ogden, Utah
Sacramento & Oregon Div.	R. H. Pratt		Sacramento, Cal.
Central Vermont	J. W. Hobart		St. Albans, Vt.
Central Vermont	‡J. M. Foss		St. Albans, Vt.
Western Division	John Schrier		Ogdensburg, N. Y.
Northern Division	J. B. Futooys		St. Johns, P. Q.
Rutland Division	J. Burdett		Rutland, Vt.
New London Northern	G. W. Bentley	G. W. Bentley	New London, Conn.
Central of Georgia	Wm. Rogers	Henry Yonge	Savannah, Ga.
Atlanta Division	W. F. Shellman		Macon, Ga.
Central Iowa	D. N. Pickering	D. N. Pickering	Marshalltown, Ia.
Central of New Jersey	James Moore	B. W. Burnet	Elizabeth, N. J.
Central Division	‡W. W. Stearns		Elizabeth, N. J.
Lehigh & Susq. Division	W. S. Polhemus		Mauch Chunk, Pa
Charleston & Savannah	C. S. Gadsden		Charleston, S. C.
Charlotte, Columbia & Augusta	G. R. Talcott	G. R. Talcott	Columbia, S. C.
Chattaroi	C. H. Rockwell	Geo. S. Richardson	Ashland, Ky.
Chesapeake & Ohio	*C. W. Smith		Richmond, Va.
Chesapeake & Ohio	W. M. S. Dunn	A. S. Emmons	Richmond, Va.
Cheraw & Darlington	J. F. Divine		Society Hill, S.
Cherokee	John Postell		Atlanta, Ga.
Cheshire	*R. Stewart	H. H. Stone	Keene, N. H.
Chester & Lenoir	James Mason		Chester, S. C.
Chicago & Northwestern	*Marvin Hughitt	R. W. Hamer	Chicago, Ill.
Chicago & Northwestern	†J. D. Layng		Chicago, Ill.
Wisconsin & Mill. Division	E. J. Cuyler		Chicago, Ill.
Peninsula Division	W. B. Linsley		Escanaba, Mich
Madison Division	C. A. Swineford		Baraboo, Wis.
Galena Division	Chas. Murray		Chicago, Ill.
Des Moines & Iowa Division	J. M. Whitman		Clinton, Iowa.
Winona & St. Peter Division	S. Sanborn		Winona, Minn.
Dakota Central Division	T. J. Nichols		Huron, Dak.
Galena & Wisconsin Br	J. B. Trull		Galena, Ill.
Chicago & Alton	*J. C. McMullen	A. V. Hartwell	Chicago, Ill.
Chicago & Alton	§§C. H. Chappell		Chicago, Ill.
Chicago Division	A. M. Richards		Bloomington, Ill.
Kansas City St. Louis Div	O. Vaughan		Slater, Mo.
Chicago & Block Coal	*A. F. Beach		Veedersburg, Ind.
Chicago, Burlington & Quincy	*Thos. J. Potter	Wm. Irving	Chicago, Ill.
Illinois Divisions	§John D. Besler		Galesburg, Ill.
Middle, Galesb'g & Q'y Div	F. C. Rice		Galesburg, Ill.
Middle Iowa Division	D. T. Bacon		Ottumway, Ia.
St. Louis & R. Isl'd Division	W. R. Crumpton		St. Louis, Mo.
Iowa Division	K. H. Wade		Burlington, Iowa.
Chicago & Eastern Illinois	O. S. Lyford	O. S. Lyford	Chicago, Ill.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Chicago & Iowa	W. H. Holcomb, *Rec.*		Rochelle, Ill.
Chicago, St. Louis & New Orleans	*J. C. Clarke	J. C. Febiger, Jr.	New Orleans, La.
South Division	W. P. McKinley		McComb City, Miss
North Division	J. G. Mann		Jackson, Tenn.
Chicago, Rock Island & Pacific	A. Kimball		Chicago, Ill.
Chicago, Rock Island & Pacific	*R. R. Cable	F. A. Marsh	Chicago, Ill.
Southwestern Division	G. F. Walker		Trenton, Mo.
Iowa Division	H. F. Royce		Des Moines, Iowa.
Illinois Division	R. H. Chamberlin		Chicago, Ill.
Keokuk & Des Moines Div	John Given		Keokuk, Ia.
Chicago & West Michigan	§C. M. Lawler		St. Joseph, Mich.
Chicago, Milwaukee & St. Paul	*S. S. Merrill		Milwaukee, Wis.
Chicago, Milwaukee & St. Paul	W. C. Van Horne	J. T. Crocker	Milwaukee, Wis.
Dubuque Division	J. H. Jenkins		Dubuque, Iowa.
Chicago & Western Div	H. C. Atkins		Milwaukee, Wis.
Northern Division	L. B. Rock		Milwaukee, Wis.
Minn. & Dakota Division	C. H. Prior		Minneapolis, Minn
Western Union Division	D. A. Olin		Racine, Wis.
Sioux City & Dak. Div	G. W. Sanborn		Mason, Ia.
Southern Minnesota Div	J. M. Egan		La Crosse, Wis
Chicago, Pekin & Southwestern	J. Murray	A. H. Cook	Chicago, Ill.
Chicago, St. Paul, Minn. & Omaha	Chas. F. Hatch	W. H. S. Wright	St. Paul, Minn.
Nebraska Division	G. V. Morford		Omaha, Neb.
Cincinnati Northern	*C. W. Bradley		Cincinnati, O.
Cincinnati & Eastern	George H. Wilber		Batavia, O.
Cincinnati, Wabash & Michigan	*Norman Beckley	Norman Beckley	Elkhart, Ind.
Cincinnati, Wabash & Michigan	O. W. Lamport		Wabash, Ind.
Cincinnati, Hamilton & Dayton	J. H. Barrett	C. M. Woodward	Cincinnati, O.
Cin., Hamilton & Indianapolis	Lewis Williams		Cincinnati, O.
Cincinnati Southern	Sam'l Woodward	Julius Uihlein	Cincinnati, O
Cin., Indianapolis, St. Louis & Chi	J. W. Sherwood		Indianapolis, Ind
Cin., Indianapolis, St. Louis & Chi		George Tozzer	Cincinnati, O.
Cleve., Col., Cin. & Indianapolis	*E. B. Thomas	J. L. Yale	Cleveland, O.
Indianapolis Division	John O. Ewan		Union, Ind
Col. and Cincinnati Divs	Robert Blee		Cleveland, O.
Cleveland & Marietta	S. C. Baldwin	R. B. Hoover	Marietta, Ohio.
Cleveland & Pittsburg	John Thomas		Cleveland, O.
Cleveland & Pittsburg	*J. D. Layng	Wm. Mullins	Pittsburg, Pa.
Cleveland, Mt. Vernon & Columb's	G. A. Jones		Mt. Vernon, O.
Cleve., Tuscarawas Val. & Wheel.	*Oscar Townsend		Cleveland, O.
Cobourg, Petersboro & Marmora	James R. Barber	J. R. Barber	Cobourg, Ont.
Columbia & Greenville	*T. M. R. Talcott		Richmond, Va.
Columbia & Greenville	J. W. Fry		Columbia, S. C.
Columbus, Hocking Valley & Tol	Geo. R. Carr	Geo. R. Carr	Columbus, O.
Toledo Division	M. T. Seymour		Columbus, O.
Hock. Valley Division	W. H. Lott		Columbus, O.
Ohio River Division	C. D. Norris		Logan, O.
Columbus & Rome	T. J. Nuckolls		Columbus, Ga.
Concord & Claremont	George E. Todd		Concord, N. H.
Concord	H. E. Chamberlin	H. E. Chamberlin	Concord, N. H.
Concord & Portsmouth	H. E. Chamberlin		Concord, N. H.
Connecticut River	John Mulligan	John Mulligan	Springfield, Mass.
Connecticut Valley	Samuel Babcock		Hartford, Conn.
Connecticut Western	J. F. Jones		Hartford, Conn.
Connecticut & Passumpsic Rivers	H. E. Folsom		Lyndonville, Vt.
Corning, Cowanesque & Antrim	A. H. Gorton	Andrew Beers	Corning, N. Y.
Connotton Valley	*C. G. Patterson	C. G. Patterson	Canton, O.
Credit Valley	H. G. Taylor		Toronto, Ont.
Cumberland Valley	J. F. Boyd	O. N. Lull	Chambersburg, Pa.
Cumberland & Pennsylvania	P. L. Burwell	P. L. Burwell	Cumberland, Md.
Cumberland & Maurice River	L. H. Dowdney		Port Norris, N. J.
D			
Danbury & Norwalk	L. W. Sandiforth		South Norwalk, C.
Danville & Southwestern	James A. Eads		Paris, Ill
Danville, Olney & Ohio River	J. M. Graham		Kansas, Ill.
Dayton & Michigan	E. E. Dwight		Toledo, O.
Dayton & Union	C. C. Gale		Indianapolis, Ind.
Delaware & Chesapeake	O. S. Sanford		Easton, Md.
Delaware & Hudson Canal Co.	R. Manville	R. Manville	Carbondale, Pa.
Delaware & Hudson Canal Co.	*C. F. Young		Honesdale, Pa.
Albany & Susq. Division	C. D. Hammond		Albany, N. Y.
Rensselaer & Saratoga Div.	Theo. Voorhees		Troy, N. Y.
Delaware, Lackawanna & Western		G. W. B. Cushing	New York City.
Delaware, Lackawanna & Western	W. F. Hallstead		Scranton, Pa.
Bloomsburg Division	G. Bogart		Scranton, Pa.
Morris & Essex Division	Andrew Reasoner		Hoboken, N. J.
Oswego & Syracuse Division	W. B. Phelps		Oswego, N. Y.
Utica, Chenango & Sus. Div	F. J. Griffiths		Scranton, Pa.
Delaware Western	David Connell		Wilmington, Del.
Denver & Rio Grande	*D. C. Dodge		Denver, Col.
Denver & Rio Grande	George W. Cushing		Denver, Col.
Denver & Rio Grande		A. B. Garner	Colorado Spr's, Col.
First Division	M. C. Kimberly		Pueblo, Col.
Second Division	W. H. Bancroft		Alamosa, Col.
Des Moines, Northwestern	H. B. Skeel		Des Moines, Iowa.
Des Moines & Ft. Dodge	C. N. Gilmore	C. N. Gilmore	Des Moines, Iowa.
Detroit, Gr. Haven & Milwaukee	W. J. Morgan	John S. Lorimer	Detroit, Mich.
Detroit, Hillsdale & Southwestern	W. F. Parker		Ypsilanti, Mich.
Detroit, Lansing & Northern		Allan Bourn	Detroit, Mich.
Detroit, Lansing & Northern	T. M. Fish		Ionia, Mich.
Detroit, Mackinac & Marquette	Tho. McKeown		Marquette, Mich.
Dorchester & Delaware	Tho. E. Wright		Cambridge, Md.
Dubuque & Dakota	A. C. Goodrich		Waverly, Iowa.
Dunkirk, Allegheny Val. & Pitts	D. Thayer		Dunkirk, N. Y.
Dunkirk, Allegheny Val. & Pitts		R. C. Moore	New York City.
E			
East Broad Top	A. W. Sims		Orbisonia, Pa.
East Alabama	W. W. Barnes		Opelika, Ala.
East Line & Red River	W. B. Ward		Jefferson, Tex.
East St. Louis & Carondelet	Joseph Hill		E. St. Louis, Ill.
East Tenn., Virginia & Georgia	**J. F. O'Brien	J. Y. Johnston	Knoxville, Tenn.
Selma Division	John M. Bridges		Selma, Ala.
N. Carolina Division	W. J. Taylor		Knoxville, Tenn.
Ohio Division	G. J. Kinzel		Knoxville, Tenn.
Alabama Central Division	J. M. Bridges		Selma, Ala.
Macon & Brunswick Div	J. M. Edwards		Macon, Ga.
Memphis Division	R. B. Pegram		Memphis, Tenn.
Eastern	**D. W. Sanborn	Geo. J. Fisher	Boston, Mass.
Eastern Kentucky	*H. W. Bates	H. W. Bates	Riverton, Ky.
Eastern Shore	W. Thompson		Prince Anne, Md.
Elizabeth City & Norfolk	*Morris K. King		Norfolk, Va.
Erie & Pittsburg	*J. D. Layng	Wm. Mullins	Pittsburg, Pa.
Erie & Pittsburg	J. M. Kimball		Erie, Pa.
Eureka & Palisade	P. Evarts		Palisade, Nev.
European & North American	F. W. Cram		Bangor, Maine
Evansville & Terre Haute	C. J. Hepburn	Jno. L. White	Evansville, Ind.
Evansville, Rockport & Eastern	G. C. Weaver		Evansville, Ind.
F			
Fitchburg	John Adams	F. S. Pratt	Boston, Mass.
Vermont & Mass. Div	‡E. K. Turner		Fitchburg, Mass
Flint & Pere Marquette	Sanford Keeler	G. G. Cook	E. Saginaw, Mich.
Eastern Division	W. F. Potter		E. Saginaw, Mich.
Western Division	V. Meredith		E. Saginaw, Mich
Florida Central	W. M. Davidson	W. M. Davidson	Jacksonville, Fla.
Florida Southern	N. R. Gruelle		Palatka, Fla.
Fonda, Johnstown & Gloversville	L. Caten		Gloversville, N. Y
Fon du Lac, Amboy & Peoria	A. Kinyon		Fond du Lac, Wis.
Fort Madison & Northwestern	S. B. Kenrick	S. B. Kenrick	Fort Madison, Ia
Fort Wayne & Jackson	M. D. Woodford	M. D. Woodford	Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	W. W. Worthington & P. Ag't.		Fort Wayne, Ind.
Frankfort & Kokomo	A. W. Hazelrigg	E. H. Andress	Lafayette, Ind.
Fredericton	F. B. Edgecombe		Fredericton, N. B

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Freehold & New York	J. E. Ralph	J. E. Ralph	Freehold, N. J.
G			
Gal., Harrisburg & San Antonio	James Converse		Houston, Texas.
Gal., Harrisburg & San Antonio		Chas. Babbidge	Boston, Mass.
Gal., Houston & Henderson	W. H. Harding	W. H. Harding	Galveston, Texas.
Geneva, Ithaca & Sayre	Wm. Stevenson		Sayre, Pa.
Georgia	*John W Green		Augusta, Ga.
Grand Haven	Geo. C. Kimball	H. Park	Allegan, Mich.
G. Rapids, Newaygo & L. Shore	*A. M. Nichols	H. Park	G. Rapids, Mich.
Grand Rapids & Indiana	W. O. Hughart, Pres't	W. R. Shelby	G. Rapids, Mich.
Northern Division	J. M. Matheany		G. Rapids, Mich.
Southern Division	P. S. O'Rourke		Fort Wayne, Ind.
Grand Trunk	*J. Hickson	John Taylor	Montreal, Canada.
Grand Trunk	W. J. Spicer		Montreal, Canada.
Chicago Division	S. R. Callaway		Chicago, Ill.
Grand Tower & Carbondale	T. M. Williamson	Wm. W. Harris	Grand Tower, Ill.
Great Western (Canada)	Charles Stiff		Hamilton, Ont.
Great Western (Canada)		G. R. Nash	London, Ont.
Greea Bay, Winona & St. Paul	*Timothy Case	Jas. S. Mott	Green Bay, Wis.
Greenville, Col. & Birmingham	E. P. Buell		Greenville, Miss.
Gneewich & Johnsonville	J. H. Thompson		Greenwich, N. Y.
Gulf, Colorado & Santa Fé	*John Sealey	F. P. Killeen	Galveston, Texas.
Gulf, Western Texas & Pacific	M. D. Monserrate		Cuero, Texas.
H			
Hannibal & St. Joseph	*John B. Carson	T. L. Dunn	Hannibal, Mo.
Eastern Division	W. R. Woodard		Hannibal, Mo.
Hanover Junction & Gettysburg	Henry A. Young	H. A. Young	Hanover, Pa.
Harlem Extension South	*R. C. Rose		Bennington, Vt.
Hartford & Connecticut Valley	Samuel Babcock		Hartford, Conn.
Havana, Rantoul & Eastern	H. E. Bullock		Rantoul, Ill.
Housatonic	L. B. Stillson		Bridgeport, Conn.
Houston, East & West Texas			Houston, Texas.
Houston & Texas Central	A. H. Swanson	A. H. Swanson	Houston, Texas.
Southern Division	M. G. Howe		Houston, Texas
Northern Division	G. A. Quinlan		Corsicana, Texas.
Huntingdon & Broad Top	Geo. F. Gage	S. B. Knight	Huntingdon, Pa.
I			
Illinois Central	E. T. Jeffrey	O. Ott	Chicago, Ill.
Chicago Division	T. J. Hudson		Cairo, Ill.
Middle Division	H. L. Frisbie		Pontiac, Ill.
Northern Division	J. C. Jacobs		Amboy, Ill.
Iowa Division	D. W. Parker		Dubuque, Ia.
Springfield Division	Wm. Wilkinson		Springfield, Ill.
Illinois Midland	L. Genis, *Rec.*		Terre Haute, Ind.
Illinois & St. Louis	C. H. Sharman		St. Louis, Mo.
Indiana, Bloomington & Western	*C. E. Henderson	H. C. Norton	Indianapolis, Ind.
Ohio Division	D. W. C. Brown		Sandusky, Ohio.
Indianapolis, Decatur & Spring.	F. L. Peck		Indianapolis, Ind.
Indianapolis & St. Louis	C. C. Gale	H. W. Comstock	Indianapolis, Ind.
Indianapolis, Peru & Chicago	*V. T. Malott		Indianapolis, Ind.
Indianapolis, Peru & Chicago		John Mc Kenna	Peru, Ind.
Indianapolis & Vincennes	J. J. Turner		Indianapolis, Ind
Intercolonial	D. Pottinger	T. V. Cooke	Moncton, N. B.
Moncton District	Jas. E. Price		Moncton, N. B.
Levis District	M. McDonald		Riviere du Loup, P. Q.
Halifax & St. John Division	Jas. Oliphant		Truro, N. S.
Northern Division	M. Busby		Campbell'n, N. B.
International & Great Northern	*H. M. Hoxie	R. B. Lyle	Palestine, Texas.
San Antonio Division	Jos. Hinton		San Antonio, Tex.
Gulf Division	J. W. Goodwin		Houston, Texas.
Iowa Eastern	H. H. Kerr		Beulah, Iowa
Iron Mountain & Helena	D. Stillfleet		Helena, Ark.
J			
Jacksonville, N. Western & S. E.	E. S. Greenleaf		Jacksonville, Ill.
Jacksonville, Pen. & Mobile	J. P. Laird		Tallahassee, Fla.
Jacksonville & Southeastern	E. S. Greenleaf		Jacksonville, Ill.
Jeff., Madison & Indianapolis	E. W. McKenna		Louisville, Ky.
Jeff., Madison & Indianapolis		Wm. Mullins	Pittsburg, Pa.
Junction & Breakwater	Tho. Groome		Lewes, Del.
K			
Kansas Central	W. A. Martin	W. A. Martin	Leavenworth, Kan
Kan. City, Burlington & Santa Fe	James Houston		Burlington, Kan.
Kansas City, Fort Scott & Gulf	L. W. Towne	H. P. Jacques	Kansas City, Mo.
Kansas City, Lawrence & South	L. W. Towne	H. P. Jacques	Kansas City, Mo.
Kan. City, St. Joseph & C. Bluffs	J. F. Barnard		St. Joseph, Mo.
Kent Co. & Smyrna & Del. Bay	J. F. Bingham		Chestertown, Md.
Kentucky Central	*I. D. Litton		Covington, Ky.
Kingston & Pembroke	B. W. Folger	Wm. Harty	Kingston, Can.
Knox & Lincoln	C. A. Coombs	C. A. Coombs	Bath, Maine.
L			
Lake Erie & Western	*E. H. Waldron	E. H. Andress	Lafayette, Ind.
Sandusky Division	D. S. Hill		Fremont, Ohio.
Bloomington Division	J. B. Funk		LaFayette, Ind.
Lake Ontario Southern	*Jas. E. Briggs		Newark, N. Y.
Lake Shore & Mich. Southern	*John Newell		Cleveland, Ohio.
Lake Shore & Mich. Southern	P. P. Wright	A. C. Armstrong	Cleveland, Ohio.
Buffalo & Erie Division	C. B. Couch		Cleveland, Ohio.
Toledo Division	Thos. Flesher, Jr		Cleveland, Ohio.
Michigan Division	J. E. Curtis		Toledo, Ohio.
Detroit Division	T. J. Charlesworth		Detroit, Mich.
Western Division	J. H. Parsons		Chicago, Ill.
Lansing Division	W. H. Canff		Lansing, Mich.
Franklin Division	Geo. H. McIntire		Stoneboro, Pa.
Lebanon Springs	*W. C. Van Alstyne		Albany, N. Y.
Lehigh Valley	Robert H. Sayre		Bethlehem, Pa.
Lehigh Valley		L. Chamberlin	Philadelphia, Pa.
Beaver Meadow Division	A. G. Brodhead, Jr		Mauch Chunk, Pa.
Mahanoy Division			Mauch Chunk, Pa.
New Jersey Division			Metuchen, N. J.
Wyoming Division	A. Mitchell		Wilkesbarre, Pa.
Levis & Kennebec	W. C. Hall		Quebec, Can.
Ligonier Valley	Thos. A. Mellon		East Liberty, Pa.
Little Rock & Fort Smith	T. Hartman		Little Rock, Ark.
Little Rock, Miss. River & Texas	J. A. Woodson	J. A. Woodson	Little Rock, Ark.
Los Angeles & Independence	W. J. L. Moulton		Los Angeles, Cal.
Long Island	Austin Corbin, *Rec.*		L'g Isla'd C'y, N.Y
Louisiana Western	C. A. Burton		Houston, Tex.
Louisville & Nashville	*F. de Funiak		Louisville, Ky.
Louisville & Nashville	§§G. C. Breed	G. C. Breed	Lousville, Ky.
Louisville & Nashville	D. W. C. Rowland		Louisville, Ky.
St. L. & S. E. Div	James Montgomery		Evansville, Ind.
Memphis Line	W. Colcamp		Memphis, Tenn.
Nashville & Decatur Div	James Geddes		Nashville, Tenn.
So. & North Ala. Division	E. Marsh		Birmingham, Ala.
Mobile & New Orleans Div	J. T. Harrahon		Mobile, Ala.
Louisville, Cincinnati & Lexington	Wm. Mahl	G. C. Breed	Louisville, Ky.
Louisville, New Albany & Chicago	John McLeod	Wm. M. Lewis	Louisville, Ky.
Louisville, N. Albany & St. Louis	H. L. Shepherd		Evansville Ind.
M			
Maine Central	Payson Tucker		Portland, Me.
Manchester & Lawrence	H. E. Chamberlin		Concord, N. H.
Manchester & North Weare	H. E. Chamberlin		Concord, N. H.
Manchester & Keene	B. F. George		Keene, N. H
Manhattan Beach	A. Corbin, *Pres't*		New York, N. Y.
Manhattan Elevated	*Frank K. Hain	James Tobin	New York, N. Y.
Manhattan Elevated	C. L. Green		New York, N. Y.
Marietta & Cincinnati	Jas. H. Stewart	J. H. Stewart	Cincinnati, O.
Marquette, Hought'n & Ontonag'n	*Samuel Schoch	R. M. McCauley	Marquette, Mich.
McKean & Buffalo	S. V. Godden		Smethport, Pa.
Memphis & Little Rock	*Wm. E. Smith	W. E. Smith	Memphis, Tenn.
Memphis & Little Rock	E. K. Sibley		Memphis, Tenn.
Memphis & Charleston	J. F. O'Brien	John A. Grant	Huntsville, Ala.
Memphis, Paducah & Northern	*N. Monsarrat	N. Monserrat	Paducah, Ky.
Mexican National	*G. Clinton Gardner	A. R. Roberts	New York, N.
Michigan Air Line	*M. S. Hadley		Romeo, Mich.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Michigan Central	*H. B. Ledyard	Allan Bourn	Detroit, Mich.
Michigan Central	E. C. Brown		Jackson, Mich.
Mackinaw & Saginaw Div	W. A. Vaughan		Bay City, Mich.
Main L'e & G. R.& Kal. Div's	C. B. Bush		Jackson, Mich.
Detroit & Bay City Div	W. A. Vaughan		Bay City, Mich.
Western Division	F. C. Nicholas		Chicago, Ill.
Middleburg & Schoharie	P. S. Demforth		Middleburg, N.Y.
Middletown & Crawford	D. Thompson		Thompson, Ridge, N.Y
Midland Railway of Canada	H. G. Taylor		Port Hope, Ont.
Milwaukee, Lake Shore & West'n	H. G. H. Reed		Milwaukee, Wis.
Mineral Range	*C. E. Holland		Hancock, Mich.
Minneapolis & St. Louis	*C. H. Hudson		Minneapolis, Minn
Minneapolis & St. Louis	E. Ryder		Minneapolis, Minn.
Mississippi & Tennessee	M. Burke	M. Burke	Memphis, Tenn.
Mississippi Valley & Ship Island	A. L. Jaquitt		Vicksburg, Miss.
Missisquoi	W. C. Smith		St. Albans, Vt.
Missouri Pacific	A. A. Talmage	R. B. Lyle	St. Louis, Mo.
Missouri Pacific	†A. W. Dickinson		St. Louis, Mo.
Eastern Division	O. H. Dorrance		St. Louis, Mo.
Central Branch Division	W. W. Fagan		St. Louis, Mo.
Western Division	Warder Cumming		Sedalia, Mo.
Kansas & Texas Division	L. Pearson		Parsons, Kan.
Mobile & Alabama Grand Trunk	F. B. Clark, Prest		Mobile, Ala.
Mobile & Ohio	*A. L. Rives	A. L. Rives	Mobile, Ala.
Northern Division	E. S. Hosford		Jackson, Tenn.
Southern Division	C. Fleming		Mobile, Ala.
Mobile & Girard	W. L. Clark		Columbus, Ga.
Mobile & Montgomery	Geo. Nason		Montgomery, Ala.
Mont Alto	G. B. Weistling		Mont Alto, Pa.
Montgomery & Eufaula	W. F. Shellman		Macon, Ga.
Montpelier & Wells River	W. A. Stowell		Montpelier, Vt.
Montrose	J. I. Blakslee	J. I. Blakslee	Mauch Chunk, Pa.
Morgan's Louisiana & Texas	Geo. Pandeley	C. A. Whitney & Co.	New Orleans, La.
Muncy Creek	H. R. Mehrling		Hughesville, Pa.
N			
Nashua, Acton & Boston	H. E. Chamberlin		Concord, N. H
Nashua & Lowell	Chas. E. Paige	Chas. E. Paige	Nashua, N. H.
Nashville, Chattanooga & St. Louis	L. W. Thomas		Nashville, Tenn
Natchez, Jackson & Columbus	J. H. Fitzpatrick		Natchez, Miss.
Naugatuck	Geo. W. Beach	Geo. W. Beach	Waterbury, Conn.
Nevada County	John F. Kidder		Grass Valley, Cal,
Nebraska	Wm. Irving		Omaha, Neb.
Nevada Central	F. W. Dunn	F. W. Dunn	Battle Mountain, Nev.
New Orleans Pacific	H. S. Moore		New Orleans, La.
New Orleans & Selma	L. B. Scofield		Selma, Ala.
Newburg, Dutchess & Connecticut	C. L. Kimball	C. L. Kimball	Dutchess J'n, N.Y.
New Brunswick & Canada	John Stewart		St. Stephen, N. B.
New Brunswick	E. R. Burpee	Alfred Seely	Gibson, N. B.
New Canaan	Wm. St. John		New Canaan, Conn.
New Castle & Oil City	*A. Vandivort		New Castle, Pa.
New Haven & Derby	E. S. Quintard		New Haven, Conn.
New Haven & Northampton	C. A. Goodnow	C. N. Yeamans	New Haven, Conn.
New Jersey & New York	J. D. Hasbrouck		Jersey City, N. J.
New Jersey Southern	Rufus Blodgett		119 Lib. st., N. Y.
New York City & Northern	F. S. Gannon		High Bridge, N. Y.
New York, Chicago & St. Louis	*Lewis Williams		Cleveland, O.
New York, Chicago & St. Louis	H. L. Morrill		Cleveland, O.
Western Division	M. E. Wattles		Wanatah, Ind.
Middle Division	C. H. Cory		Fostoria, O.
New York, Lake Erie & Western	*Robert Harris		New York, N. Y.
New York, Lake Erie & Western	E. S. Bowen	J. A. Hardenbergh	New York, N. Y.
New York, Lake Erie & Western	Benj. Thomas		New York, N. Y.
New York, Lake Erie & Western	**P. P. Wright		Jersey City, N. J.
Eastern Division	E. O. Hill		Port Jervis, N. Y.
Delaware Division	Chas. Neilson		Port Jervis, N. Y.
Susquehanna Division	R. B. Cable		Elmira, N. Y.
Buffalo & Rochester Div	R. G. Taylor		Buffalo, N. Y.
Western Division	J. S. Beggs		Dunkirk, N. Y.
New York & Greenwood Lake	Geo. Hill		Pompton, N. J.
New York, New Haven & Hartford	*E. M. Reed	R. N. Dowd	New Haven, Conn.
N. Y. & N. H. Division	John T. Moody		New York, N. Y.
Hartford Division	C. S. Davidson		Hartford, Conn.
Shore Line Division	W. H. Stevenson		New Haven, Conn.
New York Central & Hudson Riv	John M. Toucey	R. C. Moore	New York, N. Y.
Hudson River & Harlem Div	C. M. Bissell		New York, N. Y.
Eastern Division	Zenas C. Priest		Albany, N. Y.
Western Division	Geo. H. Burrows		Buffalo, N. Y.
New York Central Division	Jas. Tillinghast		Albany, N. Y.
New York & New England	*Jas. H. Wilson	W. W. McKim	Boston, Mass.
Eastern Division	O. M. Shepard		Boston, Mass.
Norwich Division	P. St. M. Andrews		Norwich, Conn.
Western Division	J. C. Rawn		Hartford, Conn.
Providence Divisior	L. W. Palmer		Providence, R. I.
New York & Sea Beach	*C. W. Douglas		110 Div. New York
New York & Sea Beach	W. A. Sheldon		Bay Ridge, L. I.
New York, Ontario & Western	Jas. E. Childs		Middletown, N. Y.
Middle Div	N. R. Hankin	Charles Clark	Middletown, N. Y.
Northern Division	C. W. Lanpher		Norwich, N. Y.
Southern Division	A. H. Danforth		Middletown, N. Y
New York, Penn. & Ohio	P. D. Cooper	J. H. Holway	Cleveland, O.
First & Second Divisions	A. L. Dunbar		Meadville, Pa.
Third and Fourth Divisions	J. W. Alsop		Galion, O.
Mahoning Division	J. M. Ferris		Cleveland, O.
New York, Providence & Boston	J. B. Gardiner		Providence, R. I
New York, Providence & Boston		Giles F. Ward	Stonington, Conn.
New York, Susquehanna & West	*H. M. Britton		New York, N. Y.
N. Y., Woodhaven & Rockaway	J. M. Lunt		Hunter's Pt., L. I.
Norfolk & Western	*Henry Fink	J. P. Minetree	Petersburg, Va.
Northern Pacific	*Herman Haupt	E. T. Williams	St. Paul, Minn.
Minnesota Division	B. McHugh		Brainerd, Minn.
Pacific & P. Orelle Div	J. W. Sprague	J. W. Sprague	New Tacoma, W. T
Missouri Division	D. R. Taylor		Mandon, Dak.
Dakota Division	C. T. Hobart		Fargo, Dak.
North Carolina	See Piedmont Air-Line.		
Northern Central	*Frank Thomson		Philadelphia, Pa.
Northern Central	Robt. Neilson	A. W. Sumner	Baltimore, Md.
Shamokin Division	A. B. Starr		Shamokin, Md
Elmira & Canandaigua Div	Spencer Meade		Elmira, N. Y.
Susquehanna Division	Tho. Gucker		Williamsport, Pa.
Northern (New Hampshire)	George E. Todd		Concord, N. H.
Northeastern (Georgia)	H. R. Bernard		Athens, Ga.
Northeastern (South Carolina)	J. F. Devine		Charleston, S. C.
North Pacific Coast	W. C. Fillmore	W. F. Russell	San Francisco, Cal.
Northwestern Ohio	J. S. Morris		Toledo, O.
Northern & Northwestern	Jas. Webster		Toronto, Can.
O			
Ogdensburg & Lake Champlain	*A. A. Gaddis		Malone, N. Y.
Ogdensburg & Lake Champlain	A. Klohs		Malone, N. Y
Ohio Central	*G. G. Hadley	F. W. Stewart	Columbus, O.
Ohio Central	F. W. Stewart		Toledo, O.
Ohio & Mississippi	W. W. Peabody	G. E. Atwood	Cincinnati, O.
Eastern Division	C. B. Cole		Seymour, Ind.
Western Division	C. M. Stanton		St. Louis, Mo.
Louisville Division	C. Cole		Louisville, Ky.
Ohio Southern	*C. E. Henderson		Indianapolis, Ind.
Ohio & West Virginia	Geo. R. Carr		Columbus, Ohio.
Old Colony	J. R. Kendrick	R. W. Husted	Boston, Mass.
Northern Division	§§. A. Webber		Fitchburg, Mass
Cape Cod Division	§C. H. Nye		Hyannis Mass.
Main Line Division	§J. H. French		Boston, Mass.
Olean, Bradford & Warren	J. W. Watson		Olean, N. Y.
Olean Bradford & Warren		J. H. Poole	Buffalo, N. Y.
Omaha & Republican Valley	P. J. Nichols		Omaha, Neb.
Omaha & Northern Nebraska	J. E. House		Omaha, Neb.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Oregon & California	J Brandt, Jr	J. Brandt, Jr	Portland, Oregon.
Oregon Railway & Navigation Co.	G. J. Ainsworth	J. M. Drake	Portland, Oregon.
Oregonian	J. M. Fillmore		Portland, Oregon.
Owensboro & Nashville	W. L. Gude		Owenstoro, Ky.
P			
Paducah & Elizabethtown	Robert Meek		Elizabethtown Ky.
Painesville & Youngstown	J. A. Newcomb		Painesville, O.
Parker & Karns City	W. C. Moberly		Parker City, Pa.
Peach Bottom	S. M. Manifold		York, Pa.
Paw Paw & Toledo & South Haven	John Ihing		Lawton, Mich.
Pennsylvania	*Frank Thomson.	Enoch Lewis	Philadelphia, Pa.
Pennsylvania	Charles E. Pugh		Altoona, Pa.
Pennsylvania	**John Reilly		Altoona, Pa.
Frederick Division	J. B. Hutchinson		York, Pa.
New York Division	James McCrea		Jersey City, N. J.
Amboy Division	I. S. Buckelew		Camden, N. J.
Belvidere Division	J. A. Anderson		Lambertville, N. J.
New Jersey Division	F. Wolcott Jackson		Jersey City, N. J.
Philadelphia Division	S. M. Provost		Philadelphia, Pa.
Middle Division	H. H. Carter		Harrisburg, Pa.
Pittsburg Division	Robert Pitcairn		Pittsburg, Pa.
Tyrone Division	S. S. Blair		Tyrone, Pa.
Bedford Division	Tho. A. Roberts		Harrisburg, Pa.
West Pennsylvania Division	A. P. Kirtland		Allegheny City, Pa.
Lewistown Division	Wm. M. Phillips		Lewistown, Pa.
Altoona Division	Wm. J. Latta		Altoona, Pa.
Pensacola & Selma	Geo. Mason		Pensacola, Fla.
Peoria, Decatur & Evansville	G. R. Cobleigh	G. R. Cobleigh	Peoria, Ill.
Perkiomen	D. B. Clack		Norristown, Pa.
Petersburg	R. Sellers	L. E. Clark	Petersburg, Va.
Philadelphia & Atlantic City	Ellis Clark	Ellis Clark	Philadelphia, Pa.
Philadelphia & Reading	*J. E. Wootten	W. S. Wilson	Philadelphia, Pa.
Catawissa & Williamsport Br.	D. C. Reinhart		Williamsport, Pa.
Reading & Columbia	Alex. M. Wilson		Columbia, Pa.
Lebanon & Tremont	H. W. Tracy		Pine Grove, Pa.
N. Penn. & B. Brook Div's'n.	E. A. Sweigard		Philadelphia, Pa.
Philadelphia & Erie	Robert Neilson		Williamsport, Pa.
Philadelphia & Erie		Enoch Lewis	Philadelphia, Pa.
Western Division	J. W. Reynolds		Erie, Pa.
Middle Division	E. B. Westfall		Renovo, Pa.
Eastern Division	Thomas Gucker		Williamsport, Pa.
Danv., Haz. & W. Barre Div.	Joseph Crawford		Sunbury, Pa.
Philadelphia, Wilmington & Balt. R.	F. Prudhomme	Enoch Lewis	Philadelphia, Pa.
Central Division	C. K. Lodge		Philadelphia, Pa.
Philadelphia, Newt'n & New York	L. L. Bush		Philadelphia, Pa.
Piedmont Air-Line	T. M. D. Alcott	R. H. Duesberry	Richmond, Va.
Richmond & Danville Div	W. A. Green		Richmond, Va.
North Carolina Division	A. B. Andrews		Raleigh, N. C.
Atlanta & Charlotte Div	I. Y. Sage		Atlanta, Ga.
Pinconning	Wm. Mercer		Bay City, Mich.
Pittsburg Southern	Jos. Ramsey, Jr		Pittsburg, Pa.
Pittsburg & Castle Shannon	A. C. Hays		Pittsburg, Pa.
Pittsburg & Lake Erie	R. W. Jones		Pittsburg, Pa.
Pit'sburg, Cincinnati & St. Louis	*D. W. Caldwell		Pittsburg, Pa.
Pittsburg, Cincinnati & St. Louis	S. M. Felton, Jr	William Mullins	Pittsburg, Pa.
Pitts., Cin. & St. Louis Div	E. B. Taylor		Dennison, O.
Col., Cin. & Ind., Cent. Div.	C. C. F. Bent		Logansport, Ind.
Col., Chi. & Ind., Cent. Div.	J. F. Miller		Richmond, Ind.
Indianap. & Vincennes Div	E. W. McKenna		Indianapolis, Ind.
Cincin. & Musk. Valley Div	Wm. F. Black		Zanesville, O.
Little Miami Div	Ralph Peters		Cincinnati, O.
Pittsburg, Bradford & Buffalo	M. Mandeville		Foxburg, Pa.
Pittsburg, Ft. Wayne & Chicago	D. W. Caldwell	William Mullins	Pittsburg, Pa.
Pittsburg, Ft. Wayne & Chicago	†C. E. Gorham		Chicago, Ill.
Eastern Division	George S. Griscom		Pittsburg, Pa.
Western Division	C. D. Gorham		Fort Wayne, Ind.
Pittsburg & Western	J. R. Bonner		Allegheny, Pa.
Pittsburg, Titusville & Buffalo	Tho. H. Wilson		Oil City, Pa.
Pittsburg, Titusville & Buffalo		John L. Awl	Pittsburg, Pa.
Pittsburg, Virginia & Charleston	J. M. Byers		Pittsburg, Pa.
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Port Huron & Northwestern	*I. R. Wadsworth		Port Huron, Mich.
Port Royal & Augusta			Augusta, Ga.
Portland & Ogdensburg	Jonas Hamilton	Jonas Hamilton	Portland, Me.
Portland & Rochester	G. P. Wescott, Rec		Portland, Me.
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Prince Edward Island	L. B. Archibald	L. B. Archibald	Charlotte'n, P.E.I.
Prospect Park & Coney Island	R. Schermerhorn		Coney Island, N.Y.
Providence & Springfield	William Tinkham	William Tinkham	Providence, R.I.
Providence & Worcester	W. E. Chamberlain		Providence, R.I.
Providence, Warren & Bristol	Waterman Stone		Providence, R.I.
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Queen Anne & Kent County	P. H. Irwin		Centreville, Md.
Quincy, Missouri & Pacific	F. D. Schermerhorn		Quincy, Ill.
R			
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Raleigh & Gaston	J. C. Winder		Raleigh, N. C.
Rhinebeck & Connecticut	J. H. Jones		Rondout, N. Y.
Richmond, York Riv. & Chesap'ke	H. T. Douglas	B. S. Crouch	Richmond, Va.
Richmond & Allegheny	*Decatur Axtell		Richmond, Va.
Richmond, Frederick'b'g & Potomac	E. T. D. Myers	T. L. Courtney	Richmond, Va.
Richmond & Petersburg	Theo. D. Kline		Richmond, Va.
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Rochester & Pittsburg	Geo. E. Merchant	Geo. E. Merchant	Rochester, N. Y.
Rockwood & Tennessee River	H. Clay Evans		Rockwood, Tenn.
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Rock Island & Peoria	H. B. Sudiow		Rock Island, Ill.
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Rome, Watertown & Ogdensburg	E. A. Van Horne		Watertown, N. Y.
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Sioux City & Pacific	J. S. Wattles		Missouri Valley, Ia.
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South Mountain	Jas. G. Knapp		Auburn, N. Y.
Southern Pacific	W. H. Woodward		Pine Grove Furnace, Pa.
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Tulare Division	§E. E. Hewitt		Los Angeles, Cal.
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Summit Branch	J. C. Missimer		Sloatsburg, N. Y.
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Terre Haute & Ind'apolis	Joshua Staples		Indianapolis, Ind.
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Texas & Pacific	†Geo. L. Sands		Marshall, Texas.
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Tioga		Jas. A. Drake	Elmira, N. Y.
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Toledo, Delphos & Burlington	W. G. Brownson	H. A. Eaton	Delphos, O.
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Toledo & Ann Arbor	H. W. Ashley		Ann Arbor, Mich.
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U			
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Union Pacific	†Jas. T. Clarke		Omaha, Neb.
Eastern Division	F. J. Nichols		Omaha, Neb.
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Mountain Division	Robert Law		Cheyenne, Wy. T.
Laramie Division	Edw. Dickinson		Laramie, Wy. T.
Colorado Division	A. A. Egbert		Denver, Col.
Kansas Division	T. Smith		Kansas City, Mo.
Kansas Division	O. H. Dorrance		Denver, Col.
Denver & S. Park Division	C. W. Fisher		Denver, Col.
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Utah Northern	Geo. W. Thatcher		Logan, Utah.
Utah Southern	John Sharp		Salt Lake City, Ut'h
Utah Western	*W. W. Riter	W. W. Riter	Salt Lake City.
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Vermont Valley	John Mulligan		Springfield, Mass.
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Vicksburg, Shreveport & Pacific	*John Scott		Monroe, La.
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Ohio & Ind.	G. W. Stevens		Fort Wayne, Ind.
Illinois	H. F. Clark		Springfield, Ill.
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Chic. & Iowa Divisions	W. F. Merrill		Chicago, Ill.
Chicago	A. H. Wood		Chicago, Ill.
Peoria	F. L. Tomkins		Peoria, Ill.
Iowa	E. N. Armstrong		Keokuk, Ia.
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C. Bluffs & Omaha	J. W. Blanchard		Stanberry, Mo.
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Warwick Valley	Grinnell Burt		Warwick, N. Y.
Washington & Ohio	R. H. Havener	R. H. Havener	Alexandria, Va.
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Welland	William Pay		St. Catherine, Ont
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Western Maryland	*J. M. Hood	J. M. Hood	Baltimore, Md.
Western North Carolina	A. B. Andrews	Geo. P. Erwin	Asheville, N. C.
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Wilmington & Northern	J. H. Thompson		Coatesville, Pa.
Wilmington & Weldon	J. F. Divine	J. F. Divine	Wilmington, N. C.
Windsor & Annapolis	*P. Innes		Kentville, N. S.
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Mil. & Eastern Div	C. F. Dutton		Milwaukee, Wis.
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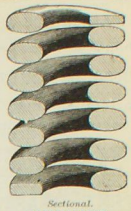

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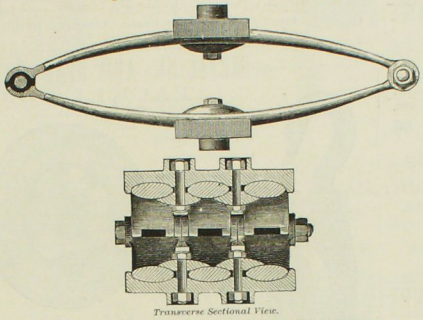

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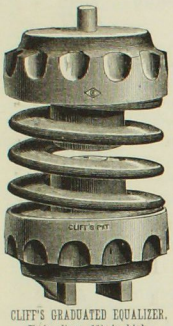

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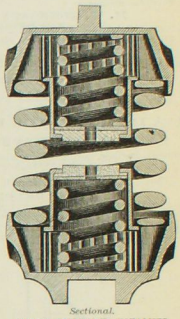

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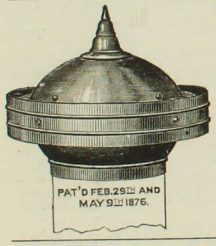

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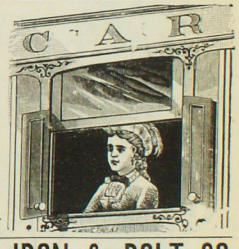

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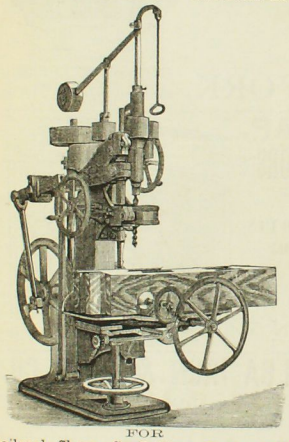

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RUBY, GREEN AND BLUE.
FOR
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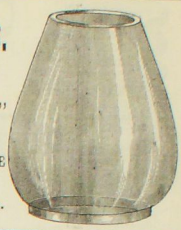
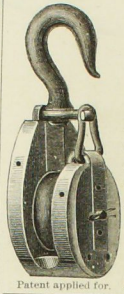


IMPROVED SNATCH BLOCK.



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These celebrated make of Tackle Blocks are making a wide reputation for themselves throughout the United States on account of their *greater durability* and ease in hoisting over all other kinds now in the market. These, together with our Improved Snatch Blocks, etc., are worthy the attention of all Purchasing Agents, who will do well to inspect these goods before purchasing elsewhere.

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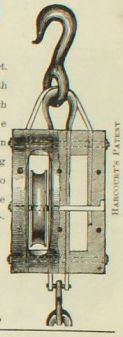

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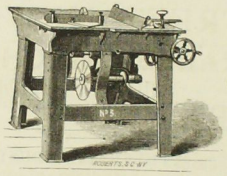

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Wardwell Saw Benches a specialty

These machines are in use in the car-shops of the Penn. R. R., B. & O., P. W. & B. B. & A. F. R., Mich. Central, and some fifty other of the largest shops in the country

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And a large number of other machines for car work.

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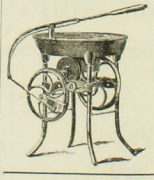

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WITHOUT BELTS. DEAD CENTER OR BACK MOTION.

WITH BELTS AND LEVER HANDLE. CHEAPEST MADE

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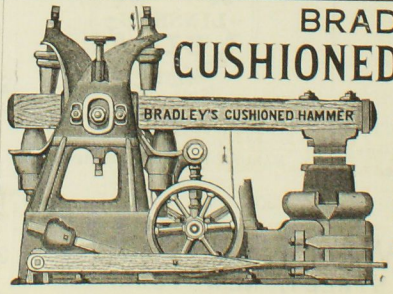

STANDS TO-DAY
WITHOUT AN EQUAL.

It approaches nearer the action of the Smith's arm than any hammer in the world.

BRADLEY & COMPANY
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[Established 1832.]

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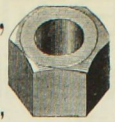
MANUFACTURE

MACHINE, CAR AND BRIDGE BOLTS,



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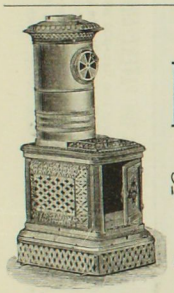
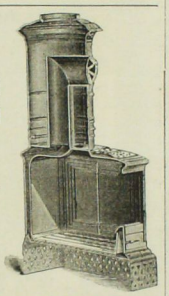
"KEYSTONE" BOILER RIVETS

EATON'S
Patent Car Stove
IS THE
Safest, most Economical and Comfortable Stove for Warming Cars,
AS ALL ROADS USING THEM WILL TESTIFY.





As may be seen in the sectional view, the draft passes through the register in the front of the drum, and passing down through the double back and bottom, reaches the fire from the front; the air being thus warmed, **does not** cut out the wood, like a direct draft of cold air, nor carry the greater part of the heat out through the pipe instead of radiating it through the sides.

EATON'S PATENT CAR STOVE

has many advantages over all other stoves. It burns less wood and gives more heat than any stove yet made. The cold air to feed the fire being taken into the stove above, the air becomes heated in passing to the fire, and causes a slower combustion, while the extra amount of radiating surface causes more heat to be thrown off. It has the advantages of a cast-iron and a sheet-iron stove combined. It is securely fastened to the floor. The door and damper are locked, and in case of collision cannot be displaced.

SHERBURN & CO., Sole Manufacturers,

Send for Circular and Prices. NO. 89 WATER STREET, BOSTON, MASS.

DENISON'S PATENT COOLING AND LUBRICATING COMPOUND,
FOR COOLING AND LUBRICATING HOT JOURNALS.

DIRECTIONS.—For cars or engines, pack the box so that the Compound will come in contact with the bearing and journal, using waste saturated with oil; also moisten the Compound with oil.

For shafting and places where waste can not be used, mix the Compound with oil, and apply to the bearing. If the bearing be very hot, the first application may run off, but two or three applications will cool it.

When a journal is hot, don't cool it with water, but apply the Compound; **and no matter how hot it is, it will cool it while in motion.**

When you apply new bearings, fill them with the Compound before putting them on the axle, and pack the sides of the box next to the bearing with the Compound, and your boxes will run cool.

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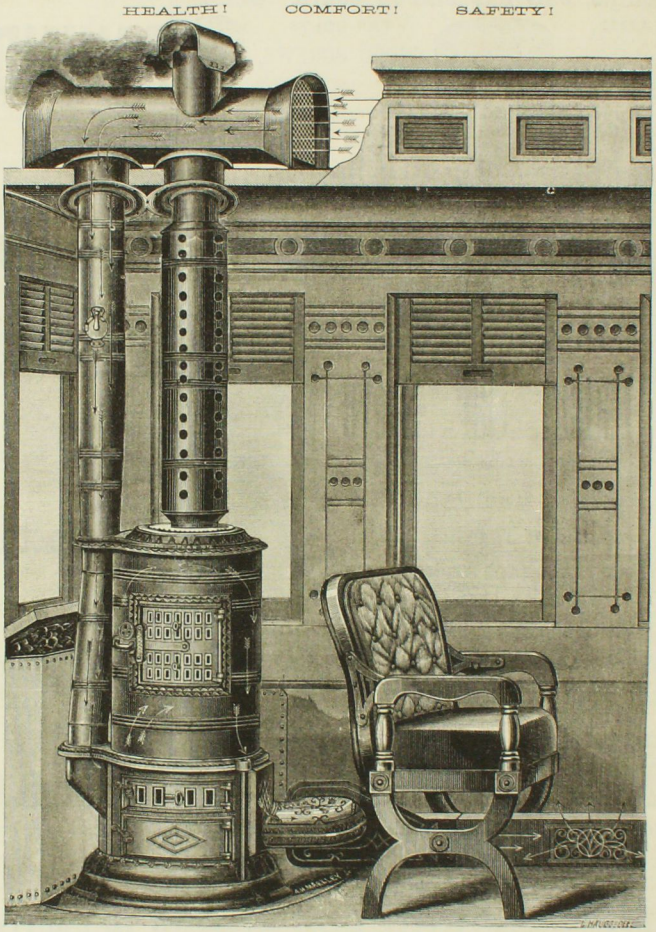
Improved Anti-Clinker Railway Car Heater & Ventilator.

HEALTH! COMFORT! SAFETY!

WE CLAIM FOR OUR HEATERS THE FOLLOWING ADVANTAGES OVER ANY OTHER IN USE FOR RAILWAY CARS.

1.—An equal quantity of hot air is distributed throughout the car.
2.—Persons sitting near the stove are not hotter than those at a distance, and are not obliged to open the windows, to the annoyance of others.
3.—All the impure air is driven out at the top of the car.
4.—The air in the car never comes in contact with the heated surface of the stove, as all the air that is heated is brought fresh from the outside—thus heating and ventilating the car at the same time.
5.—There is no danger of accidents from passengers' clothing taking fire by coming in contact with the stove.
6.—In numerous cases where cars containing this stove have been overturned, it has never been known to set fire to the car, or even to be moved out of its place.



No. 16—"A" PATTERN.

An important feature about our Heaters is the PATENT ANTI-CLINKER GRATE.

The object of this invention is to **remove the ashes and clinkers from the fire-pot without dropping the fire out.** This can be done with less trouble than it takes to rake the old kind of stoves, and a **continuous fire** be kept going **always fresh** on the grate. By this means the entire surface of the Stove can always be relied on for heat; but in other stoves, when the grate surface becomes covered with clinkers, and the cylinder half filled with ashes and clinkers, only the upper surface will afford heat—thus very often resulting in the overheating and ruining of the stove. With our **Improved Grate,** the base of the stove is always hot. In this stove we give **a bottom as well as a top view of the fire;** whereas in all other stoves the fire can only be seen from the top. With this improvement **we can always** tell when the fire requires raking.

We invite special attention to the above cut, which illustrates our improved Anti-Clinker Car Heater and Ventilator. Many devices have been tried for heating and ventilating railway cars, and most of them have proven failures, but by our improved plan, cars can be thoroughly heated and ventilated. The fresh air is taken in at the top of the car through the ventilator, passing down a pipe to the base of stove, around the heated cylinder, and through a 4 × 6 tin pipe along the side of car, escaping through registers between the seats, thus warming the feet of passengers, thoroughly heating the car, and forcing the foul air out through the top openings. In making the attachment from heater to tin pipe we use a cast-iron elbow, which makes a complete connection between the heater and hot-air pipes. Persons who travel in railway cars know how uncomfortably hot the seats are near the stove, and how often they are obliged to raise the windows, to the annoyance of passengers at a distance from the stove, who are suffering from the cold; and also how **ILLY VENTILATED** most cars are, on account of the air in the car coming in contact with the heated plates of the stove.

WOULD BE PLEASED TO HAVE YOU CONSIDER OUR IMPROVEMENT AND THE UTILITY OF USING IT IN YOUR CARS.

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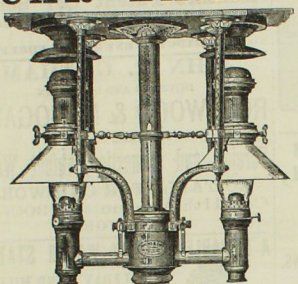
STEEL CASTINGS,
RAIL-ROAD AND MACHINE CASTINGS
OF ALL KINDS FROM ¼ LB TO 10 TON.
LOCOMOTIVE CROSS HEADS
AND GEARING A SPECIALTY.
EUREKA CAST STEEL CO.
No 307 WALNUT ST. PHILAD.
WESTERN OFFICE 45 LA SALLE ST. CHICAGO, ILL.

CAR LAMPS.



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Designers and Manufacturers of every description of
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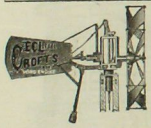
Years of close observation and careful experiments have enabled us to produce a Lamp for Railroad use, which, both for efficiency and economy, is without a rival. It has been adopted by the Pullman Car Company, Metropolitan Elevated Railway Company, and many other Railroads, and is giving **Universal Satisfaction.**
Send for Catalogue and Price List.



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CROFT'S
IMPROVED
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Manufactured by
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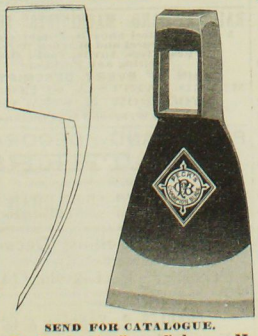
Also dealer in Pumps, Tanks, Pipes, Corn Shellers, Corn Grinders, Power Converters with both Lever and Rotary Motion applied to Wind Mill Power, and everything pertaining to Wind Engine Machinery.
☞ Before purchasing any wind-mill, send for circular and price list. Mention this paper.
SPRINGFIELD, OHIO.

SUPERIOR
RAILROAD ADZS,
Also Broad Hatchets, Axes and Other Edge Tools for Railroad Use.



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THE SOPER & POND CO.,
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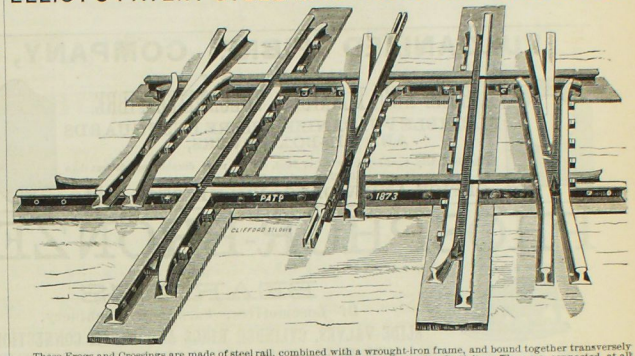
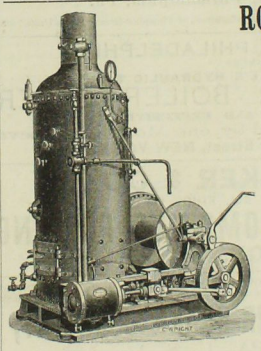
KILN-DRIED CAR SIDING AND ROOFING
OUR SPECIALTY.
SEND FOR PRICES.
CAR LUMBER.

ELLIOT'S PATENT STEEL RAIL FROGS AND CROSSINGS.



These Frogs and Crossings are made of steel rail, combined with a wrought-iron frame, and bound together transversely with strong bolts, which give it great strength and durability without destroying its elasticity. They are connected at all ends by Fish-Plate Joints, and lie on the same tie surface as the running rail without any cutting of ties, thus saving a great deal of time and labor in putting in place in track.
Manufactured by H. & H. ELLIOT, East St. Louis, Ill.



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IMPROVED SINGLE OR DOUBLE CYLINDERS—
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IMPROVED PORTABLE AND STATIONARY ENGINES—PORTABLE, STATIONARY AND VERTICAL BOILERS.
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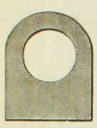

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being absolutely unaffected by oil or heat, are far more durable and efficient than Leather, and much cheaper.

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For BOILERS, STEAM, HOT AIR, GAS and WATER PIPES.

Purchasers can fit it with their own workmen, thereby saving half the cost of application.

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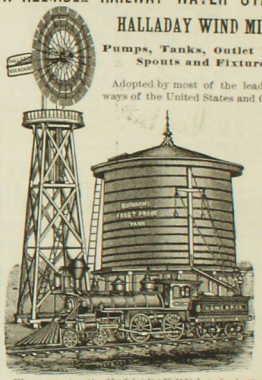

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FRAZER TALLOW COMPOUND,

being especially adapted to passenger or fast-moving trains. Its consistency is scarcely changed by the extremes of heat and cold, having been used and tested for many years by important roads in the extreme Northern States, as well as by leading roads in the Cotton States of the South. The great advantages in its use are economy and exemption from hot boxes.

We also offer the

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We invite correspondence, and, to such parties as desire it, we will ship one barrel or more as a trial, asking pay for only such as is used.

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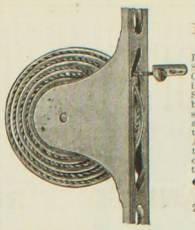

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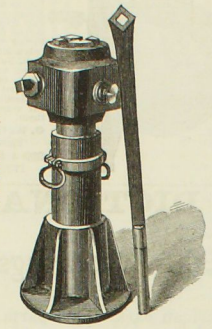

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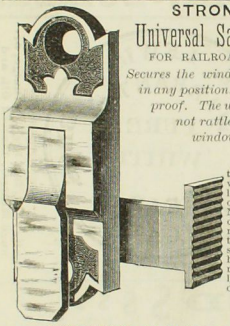

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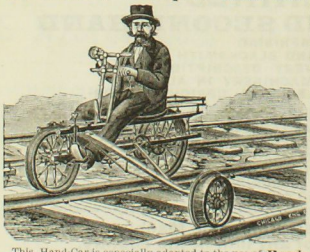

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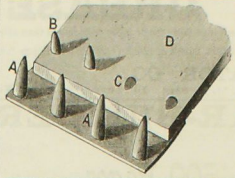

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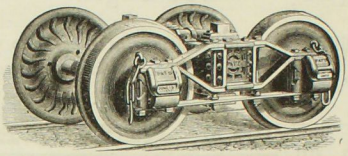

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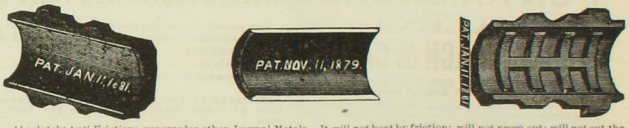

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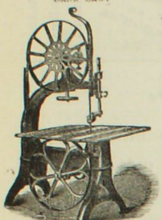

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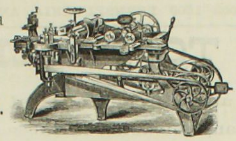

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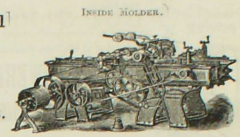

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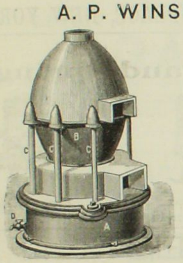

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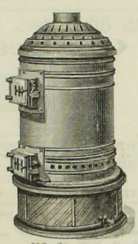

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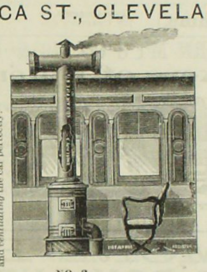

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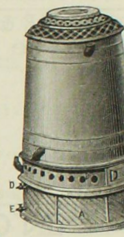

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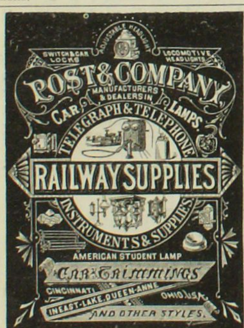

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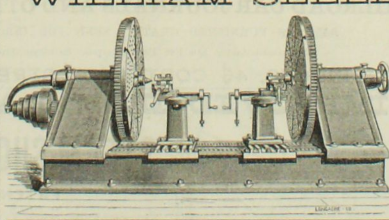

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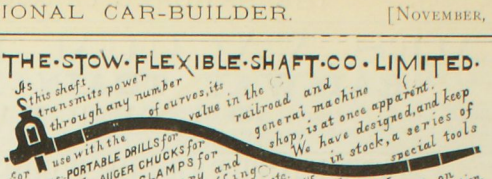

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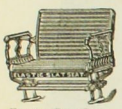
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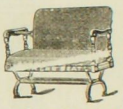
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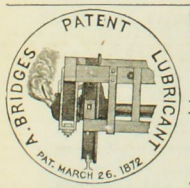

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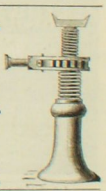

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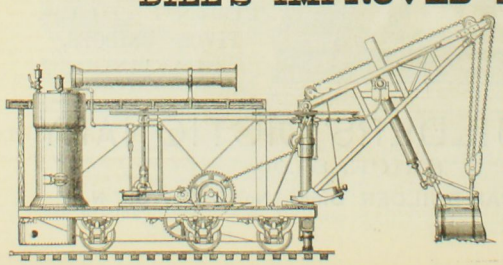

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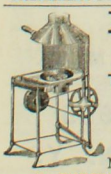

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DEAR SIR: Inclosed please find one dollar in renewal of my subscription to your paper. I am much pleased with its manifest improvement during the past year, making it more and more valuable for the information it contains in the interests of railway rolling stock; and I also think it is the best paper for the use of business men in reaching the supply departments of railroads. Wishing you continued success, I am

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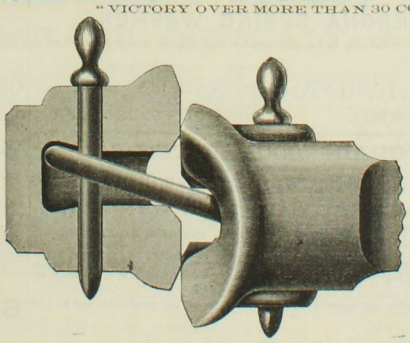

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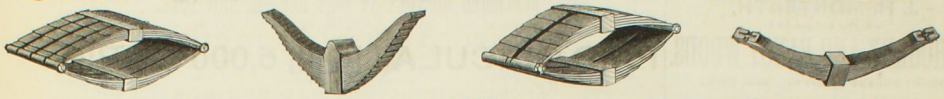

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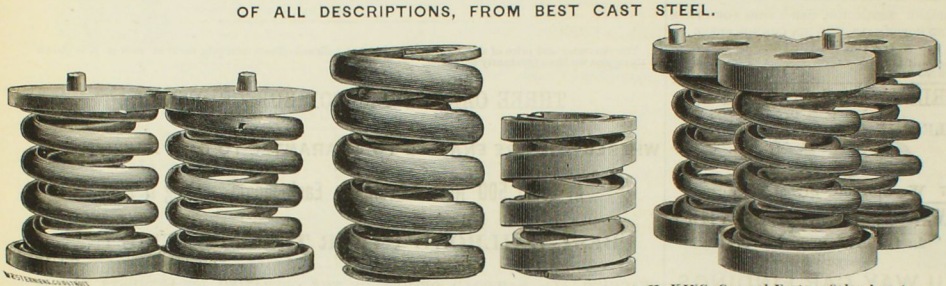

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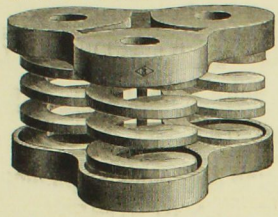

Diameter ..... 11¼ inches.
Height ..... 6¾ "
Weight ..... 72½ lbs.
Capacity, each spring, 30,000 lbs.

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Car Spring Company,

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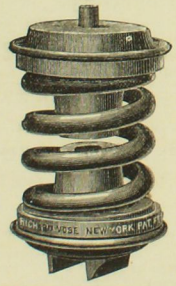

Adapted to a Car-Body Weighing 32,000 Lbs.
Diameter, outside Casting, 8 in.
Height, Bearing to Bearing, 11¼ in.

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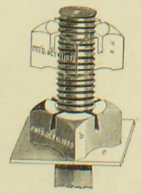

J. W. LARABEE, Treasurer.

a, ATWOOD NUT on bolt without bearing on base—slots open. *b*, ATWOOD NUT turned to bearing *c*, partially closing the lots and grasping the bolt.

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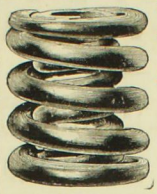

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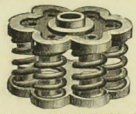

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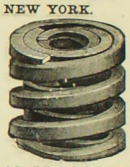

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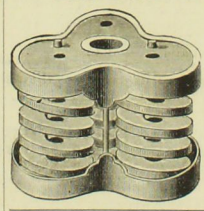

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SPIRAL DRAW BOLSTER

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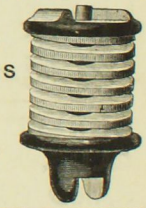

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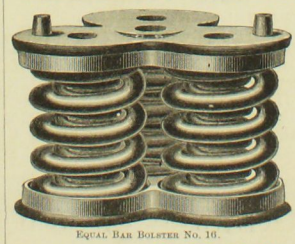

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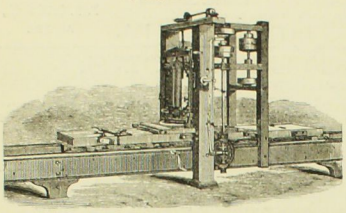

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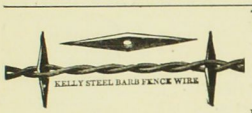

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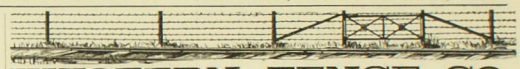

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